Infortrend EonStorDS DS 3000 Series

2U / 3U / 4U Systems

Version 1.1

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Customer Support

Contact your system vendor or visit the following support sites.

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Safety Precautions

Read these instructions carefully before you install, operate, or transport the EonStorDS RAID system and JBODs.

Installation and Operation

- Install the rack cabinet and the associated equipment at a site where the ambient temperature (special room cooling equipment may be required) stays lower than:

    a. **35°C** ~ if your system have a BBU (all dual controller systems come with BBU by default)

    b. **40°C** ~ if your system does not have a BBU

- Install the power source socket outlet near the enclosure where it is easily accessible and ground the rack cabinet.

- Secure airflow clearance inside and around the rack cabinet.
  - Secure an 18 to 20cm clearance on the rear side.
  - Do not cover the enclosure openings.
  - Route the cables inside the rack cabinet.
  - Do not leave drive bays empty as it will affect airflow efficiency.

- Secure each enclosure module using its retaining screws.

- Place power cords and other cables away from foot traffic. Do not place items on top of power cords and make sure they do not rest against data cables.

- Install all modules to the enclosure before powering-on systems.

- Ensure that the correct power range is being used before powering-on.

- DO NOT remove covers or replaceable modules if they are not faulty.

- If the system is not going to be used for a long period of time, disconnect it from the power mains to avoid transient over-voltage.

- For power source redundancy, please make sure that the two PSUs are plugged into two different power sources (ie. different circuit breakers).

Service and Maintenance

- Keep the faulty module in place until you have a replacement unit; an empty module greatly affects the airflow efficiency within the enclosure.
- During service operation, place the enclosure on soft and clean surface to prevent exterior damage. Do not place tools or other items on top.
- When transporting the enclosure, repackage all disk drives separately in the original package foam blocks. Replaceable modules can stay in the enclosure if you are using the original package; if not, repackage them separately as well.
- Disconnect the power cords before servicing or cleaning the enclosure.
- Use a slightly moistened paper sheet or cloth for cleaning. Avoid using liquid or sprayed detergent.
- When replacing components, insert them as gently as possible while assuring full engagement. Vibration and shock can easily damage hard drives.
- Only qualified service personnel should open the enclosure.
- Contact service personnel if any of the following situations occurs:
  - The power cord or plug is damaged.
  - The enclosure has been exposed to moisture.
  - The system has not been working properly.
  - The enclosure was dropped against a hard surface.
  - The enclosure shows obvious signs of breakage.
- To move the enclosure, more than one person might be necessary due to its weight. Drives should be removed from the enclosure beforehand.

Important Notice

The use of Infortrend certified components is strongly recommended to ensure compatibility, quality and normal operation with your Infortrend products. Please contact your distributor for a list of Infortrend certified components (eg. SFP, SFP+, HBA card, iSCSI cable, FC cable, memory module, etc.).

ESD Precautions

- Handle the modules by their retention screws, ejector levers, or the module’s metal frame/faceplate only. Avoid touching the PCB boards or connector pins.
- Use a grounded wrist strap and an anti-static work pad to discharge static electricity when installing or operating the enclosure.
- Avoid dust, debris, carpets, plastic, vinyl, and styrofoam in your work area.
- Do not remove any module or component from its anti-static bag before installation takes place.
- Drives must not be stacked on top of each other without their protective drive trays. Even when drives are fixed in the drive trays, contacting the exposed PCB or rear-side interface may damage the drives.

About This Manual

The manual introduces hardware components of EonStorDS 3000 Series' 2U, 3U and 4U RAID and JBOD systems. It also describes how to install, monitor, and maintain them.

For non-serviceable components, please contact our support sites.

Firmware operation: Consult the Firmware User Manual on the CD-ROM.

SANWatch software: Consult the SANWatch User Manual on the CD-ROM.

Revision History

Version	Date	Description
1.0	Sep. 2013	Initial release
1.1	Jan. 2014	Added 3024B series (2.5" form factor)

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Introduction

Product Overview

This manual introduces 2U, 3U and 4U RAID/JBOD system that support 3Gbps, 6Gbps SAS or 3Gbps (SATA-II) and 6Gbps (SATA-III) drive interfaces. The 2U/ 3U/ 4U enclosure is designed to utilize 3.5" hard drives. Drive capacity can be expanded by attaching expansion hard drive enclosures (JBODs).

Model Naming Conventions

The naming rules for RAID and JBOD models are explained in the example below:

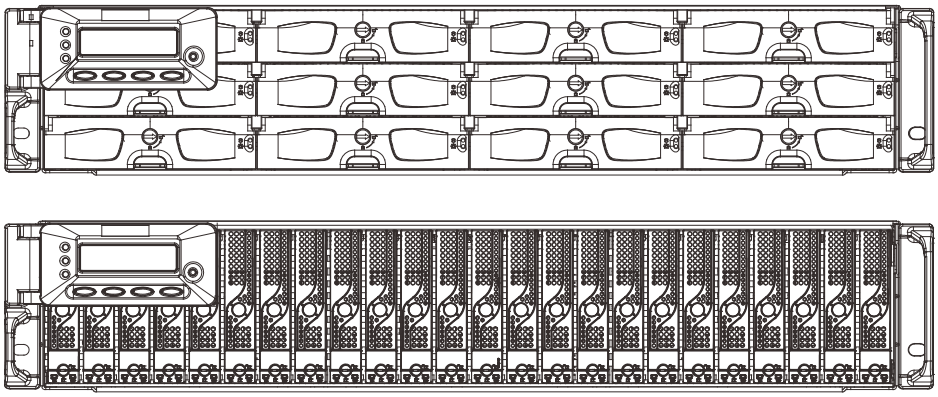
RAID: DS3024RTEBF6 → ES$^{(A)}$ + 80$^{(B)}$ + 24$^{(C)}$ + R$^{(D)}$ + T$^{(E)}$ + E$^{(F)}$ + B$^{(G)}$ + F6$^{(H)}$

JBOD: JB2012R → JB$^{(A)}$ + 20$^{(B)}$ + 12$^{(C)}$ + R$^{(D)}$

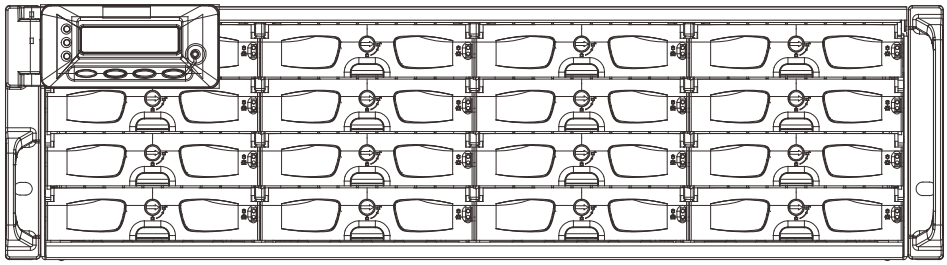
Designation	Description	
(A)	ES = EonStorDS systems JB = JBOD systems	
(B)	30 where 0 indicates first generation, 1 indicates second generation and so on	
(C)	12 = 2U systems, 12 hard drives capable 16 = 3U systems, 16 hard drives capable 24 = 4U systems, 24 hard drives capable	
(D)	**R** = redundant (dual) controllers **S** = single and upgradeable to dual controllers **G** = single and **NOT** upgradeable to dual controllers	
(E)	T = Turbo performance (high IOPS) Standard system CPU if not mentioned	
(F)	E = iSCSI default onboard No iSCSI onboard if not mentioned	
(G)	B = 2.5" form factor HHD 3.5" form factor HHD if not mentioned	
(H)	F8 = Fibre 8Gb F6 = Fibre 16Gb S2 = SAS 6Gb	E1 = iSCSI 1Gb E2 = iSCSI 10Gb (SFP+) E3 = iSCSI 10Gb (RJ45)

Model Variations

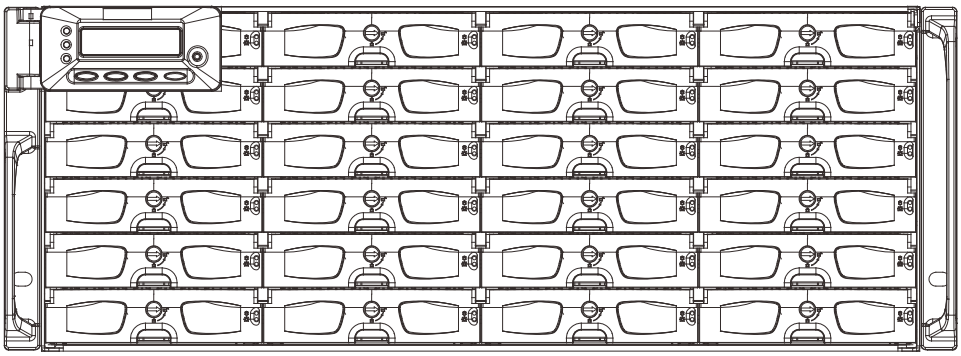
Comprised of RAID and JBOD models, the RAID systems store hard drives and control the entire storage system while JBOD systems connect to a master RAID system and can expand storage capacities by adding more hard drives. All systems are compatible with SAS-3 and SAS-6; SATA-II and SATA-III hard drives. However hard drive limitation(s) may vary model to model.



2U systems



3U systems



4U systems

Major Components

NOTE

Upon receiving your system, check the package contents against the included **Unpacking List**. If module(s) are missing, please contact your system vendor immediately.

The Cache Backup Module (CBM) is an optional feature in single controller systems.

RAID Controller and Interface

Each RAID controller comes with a pre-installed DIMM module.

The traditional battery backup is replaced by an innovative Cache Backup Module methodology (CBM) which consists of a battery backup unit (BBU) and flash backup module (FBM). Cached data is quickly distributed to a flash backup module with the support of a BBU in the event of a power outage. Because of a shorter discharge time, BBU life expectancy is extended, and data is safely kept in flash regardless of the traditional 72 hours limitation.

The embedded firmware features intelligent algorithms, such as power-saving modes, variable fan speeds, and exiled drive handling, making this model a greener choice.

JBOD Controller and Interface

The enclosure is managed by expander controllers that distribute data flow to individual disk drives and report operating status through a proprietary enclosure service via in-band protocols. The enclosure, along with other JBODs, connects to a RAID system and serves as a building block of a scalable configuration.

In terms of supported protocols, the firmware supports communications with enclosure devices, SAS/SATA disk drives and as RAID system featuring 6Gbps SAS expansion ports.

In terms of physical connection, the SAS interface provides ease of cabling through Mini-SAS connectors. With a backplane adapting SAS or SATA drives, the system supports enterprise-class SAS, cost-effective SATA-II or SATA-III hard drives, and is ideal for adding large capacity to a storage pool.

Power supply unit with built-in cooling module

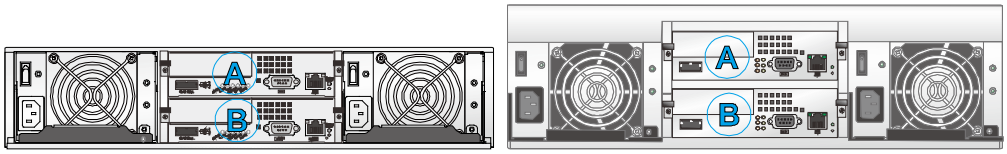
2U and 3U series: Two cooling modules built into the power supply unit (PSU) protect the system from overheating, and two hot-swappable PSUs provide constant power to the system. The modular nature of the system and the easy accessibility to all major components ensure ease of maintenance.

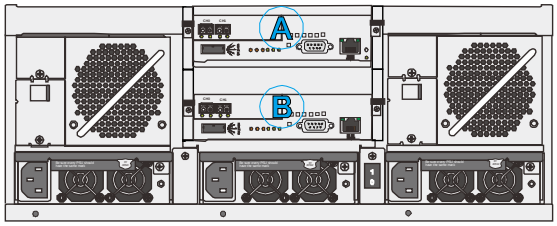
4U series: The cooling modules can be located on both sides of the controller at the rear. Their PSUs have built-in cooling modules as well to aid the main cooling modules to keep the system ventilated.

The Rear Panel

Dual Controller Models

Dual controller systems are indicated by an “R” in their model number (please refer to Model Naming Conventions). Controller A is located on top and controller B at the bottom for dual controller models. In dual controller configuration, if one controller fails, the second controller module will take over in a manner that is transparent to application servers.





2U vs 3U vs 4U

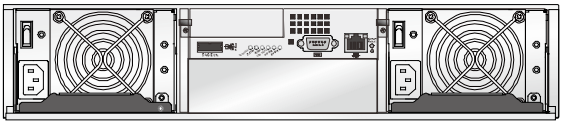
The top controller (Controller A) is the primary controller which manages the entire RAID system in normal operations. The bottom controller (Controller B) is the secondary (= redundant) controller which is idle during normal operation and takes over the management role when Controller A cannot function properly due to hardware error, controller module removal, etc.

If the failed Controller A restarts or a replacement is installed, Controller A will temporarily assume the role of the secondary controller.

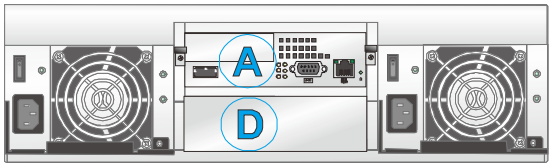
When the RAID system is rebooted, all system configurations will revert back to the default state and Controller B returns the primary role to Controller A.

Single-Controller Models

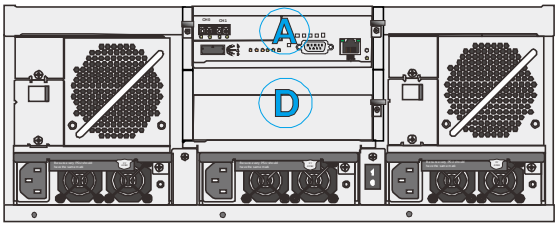
Single-controller models are designated by a “G” or “S” in their model number. The second controller slot is filled with a dummy cage **(D)**. The 2UL-C and 2UL model differs in the additional cooling module at the center-bottom position.



2U systems



3U systems



4U systems

Upgrading Single Controller to Dual Controller System

If the model name of a single controller RAID/JBOD is designated with the letter “S”, it can be upgraded into a dual-controller configuration by adding another controller module and firmware upgrade (see software manual). If the model name is designated with a “G”, it is not upgradeable to a dual controller configuration.

- ES8024**S**: Upgradeable
- ES8024**G**: **NOT** upgradeable

For details, please contact your vendor for details.

Connection between RAID and JBOD

The following rule applies when connecting RAID and JBOD(s):

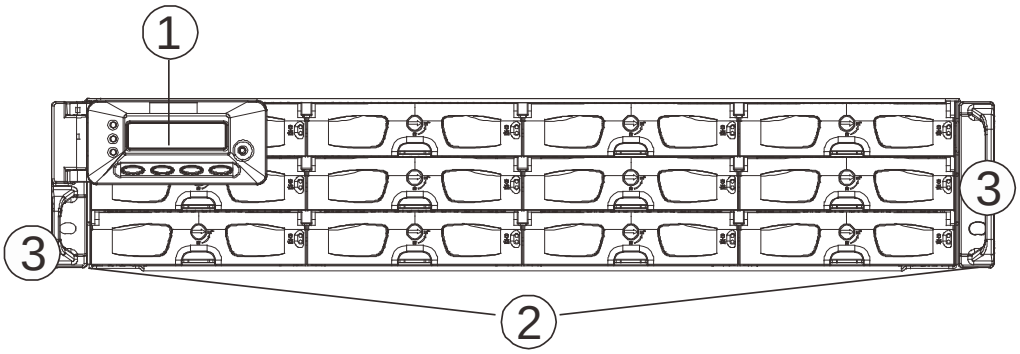
- Dual-controller RAID connects to dual-controller JBOD.
- Single-controller RAID connects to single-controller JBOD.

Chassis

The RAID chassis is a rugged storage chassis divided into front and rear sections. The chassis is designed to be installed into a rack or cabinet.

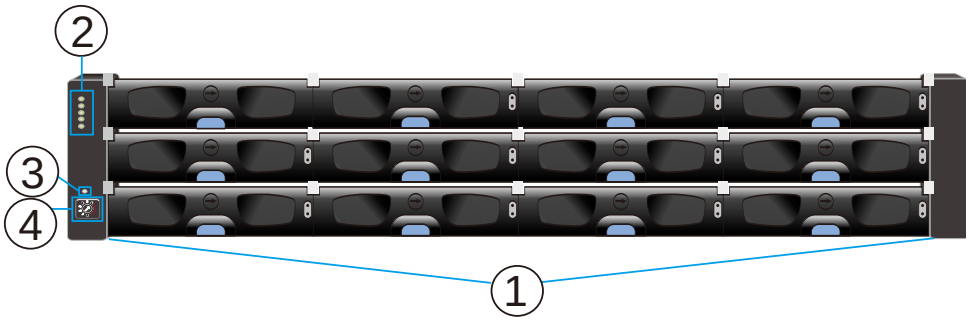
Front Panel

RAID Models



- **LCD keypad panel (1):** A 16 characters x 2 rows LCD panel and function keys allows you to view system events and configure the firmware.
- **Drive trays (2):** Each drive tray is hot-swappable and holds a 3.5-inch hard drive.
- **Handles (3):** There are handles on both sides of the enclosure for users to pull / push the enclosure out and into the cabinet.

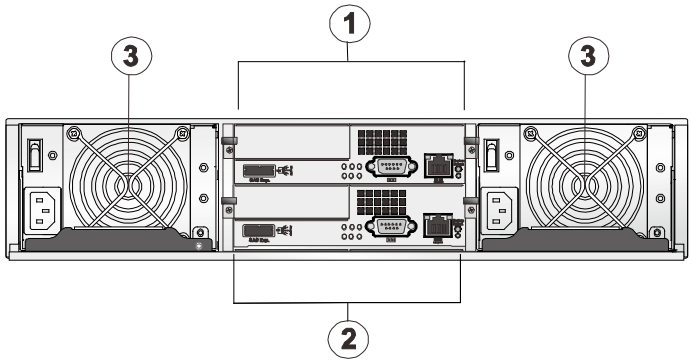
JBOD Models



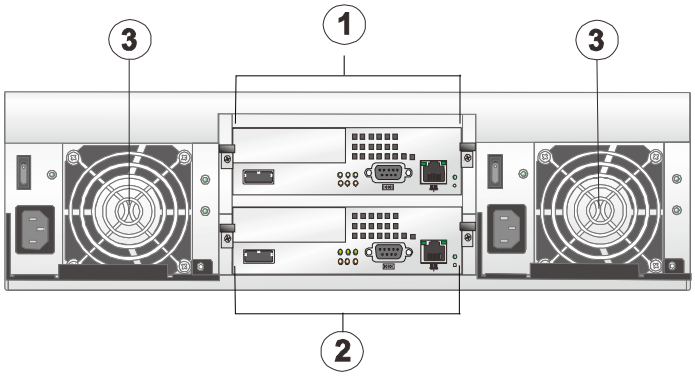
- **Drive trays (1):** Each drive tray is hot-swappable and houses a 3.5-inch hard drive.
- **LED panel (2):** The LED panel indicates the operating status through five LEDs.
- **Mute / Service button (3):** The mute button is to mute an alarm when sound or to indicate to the administrator the system requires service.
- **Rotary ID switch (4):** The rotary ID switch is for users to set a unique ID to each JBOD when connected in a multi-array environment.

Rear Panel

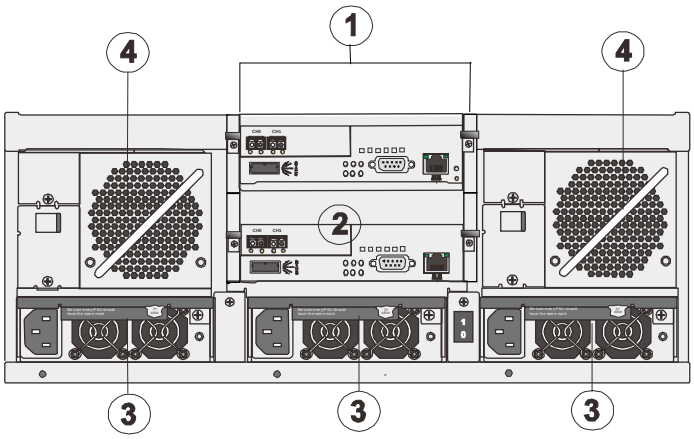
Designation	Description	Designation	Description
1	Controller A	**4**	Cooling Module
2	Controller B	**5**	Dummy cage
3	Power supply + cooling module		



2U systems



3U systems



4U systems

- **RAID controllers (1) / (2):** Each RAID controller module contains a main circuit board and a pre-installed DIMM module. For single controllers, a **dummy cage** will be placed at the controller **(2)** position. The host port configurations will vary. For details, see Rear Panel Components.

WARNING

Do NOT remove the dummy cage for the single-controller model. Doing so will disrupt the internal airflow.

- **Power supply unit & cooling module (3):**

  2U & 3U: The hot-swappable PSUs provide power to the system. There is a cooling module within each PSU. Please refer to your specific system for details shown in the later sections of this chapter.

  4U: There are three hot-swappable power supply units to supply power to the system. A power switch can be located on right hand side of the PSU situated in the middle.

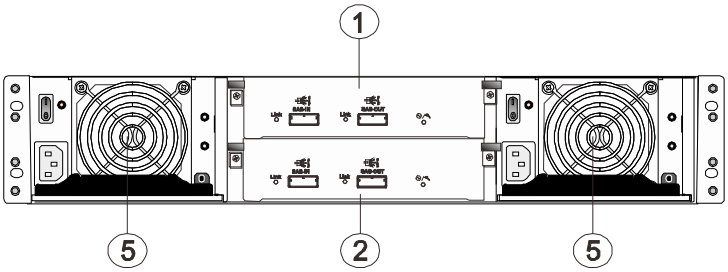
- **Cooling modules (3) & (4):**

  2U & 3U: The redundant cooling modules ventilate the system and for selected 2U models, they may or may not be embedded in the power supplies. For details, please refer to 2U / 3U RAID series Cooling Module.

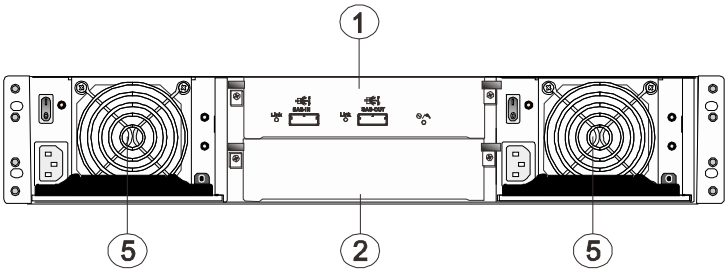
  4U: The cooling modules are user serviceable and are standalone units on both sides of the controller. For details, please refer to 4U RAID series Cooling Module.

JBOD Rear Panel

Designation	Description	Designation	Description
1	Controller A	**4**	Cooling Module
2	Controller B or dummy cage (for single controller models)	**5**	Power supply + cooling module
3	Power supply		



Dual controller JBOD



Single controller JBOD

- **Controller (1):** The controller module contains a SAS expander board, which distributes I/Os from and to the managing RAID system. The controller also handles component status report and reports component status through the SAS links with a RAID system.
- **Dummy cage (2):** For single controller systems, a dummy cage is placed in the bottom controller position. Do not remove the dummy cage as it will disrupt internal system airflow.
- **Power supply (3):** The hot-swappable power supply units (PSUs) provide power to the JBOD. A power switch can be located on each PSU.
- **Cooling modules (4):** The redundant cooling modules ventilate the system.

Internal Backplane

An integrated backplane separates the front and rear sections of the chassis. This circuit board provides logic level signals and low voltage power paths. Thermal sensors and I^2C devices are embedded to detect system temperatures and PSU/cooling module operating status. This board contains no user-serviceable components.

WARNING

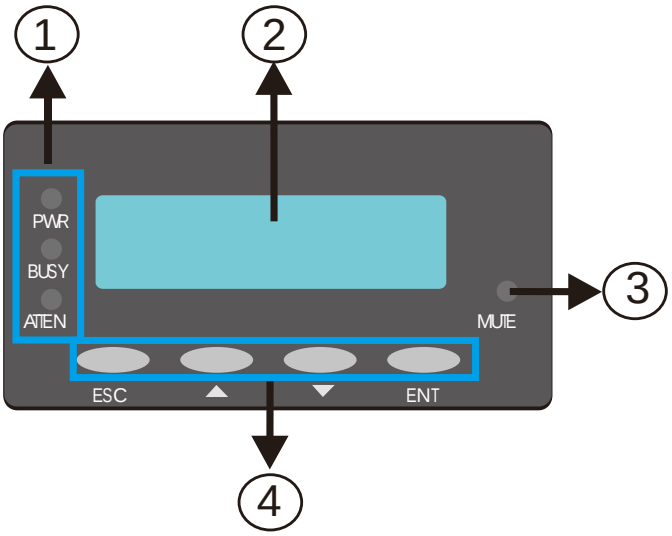
Accessing the backplane board may lead to fatal damage of the system. Also, physical contact with the backplane board may cause electrical hazards.

Front Panel Components

LCD/LED Panel

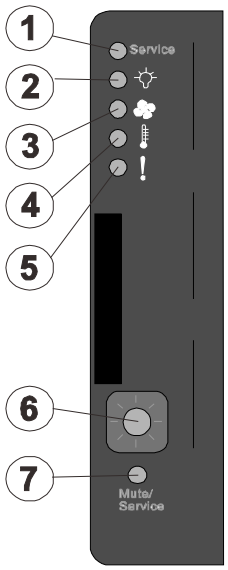
LCD Keypad Panel for RAID Models

The LCD keypad panel provides full access to RAID configuration settings and system information (refer to firmware manual for details). Initially, the LCD screen shows the system's model name and the name can be manually assigned for identification in a multi-array configuration.



- **Status LEDs (1):** From top to bottom, the status LEDs are power (PWR), busy (BUSY) and attention (ATTN).
- **LCD screen (2):** The 16x2-character LCD screen provides users access to firmware-embedded utility.
- **Mute button (3):** Press the **MUTE** button to silence the alarm.
- **Function and scroll buttons (4):** Press the **ENT** button for two (2) seconds on the initial screen to enter the main menu. Press the **ESC** button to clear the current event. Press the **UP** and **DOWN** arrow keys to select viewing items.

LED Panel for JBOD Models



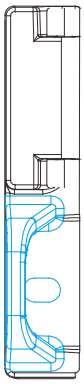
The LED panel on a JBOD storage expansion system can be located on the chassis ear. The LED panel contains Service LED **(1)**, a power supply status LED **(2)**, cooling module status LED **(3)**, temperature sensor status LED **(4)**, System fault LED **(5),** rotary ID switch **(6)** and a Mute Service button **(7)**. For details, please refer to LED Panel for JBOD Models.

WARNING

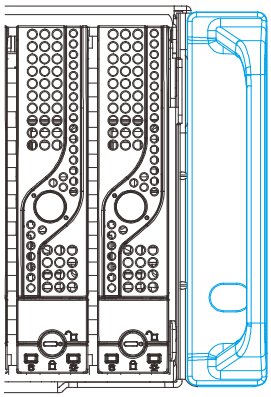
If critical faults are indicated on the LED panel, verify the cause of the problem as soon as possible and contact your system vendor and arrange for a replacement module.

Chassis Ear

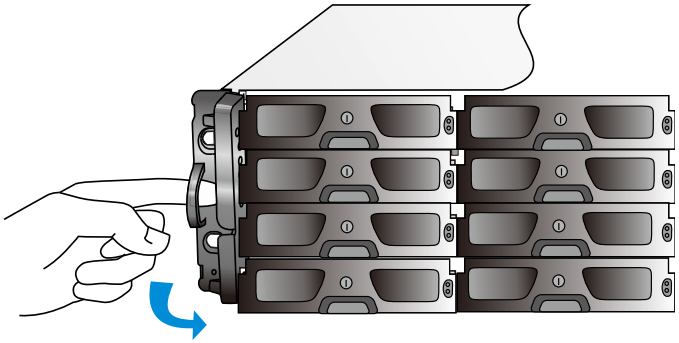
Each chassis ear features a finger grip and hole(s) for securing chassis to the front rack posts. In JBOD models, an LED panel (see the previous sections for details) is mounted on the left chassis ear. A plastic housing conceals the chassis ear.



Left



Right

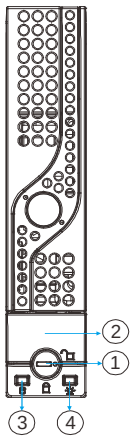
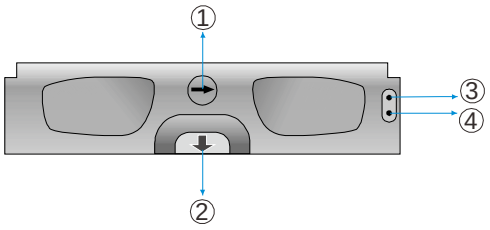


To access the finger grips, flip open the panel. You may then grasp the finger grip for retrieving a chassis out of a rackmount rack.

NOTE

The chassis ears can not support the weight of the system. Do not use these finger grips when re-locating the system.

Drive Tray Bezel

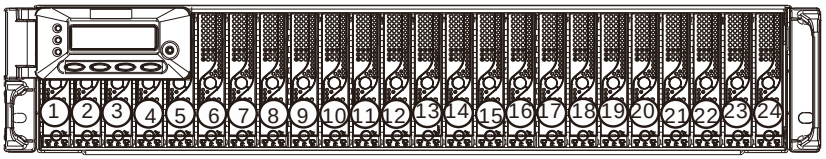
	
2.5 inch	3.5 inch

The drive tray is designed to accommodate separately purchased SAS or SATA interface hard disk drives. There is a rotary bezel lock **(1)** that secures the drive tray in chassis, while a release button **(2)** can be used when retrieving disk drives from the chassis. To the right of the bezel plate, there is a drive busy LED **(3)** and a power status LED **(4)**.

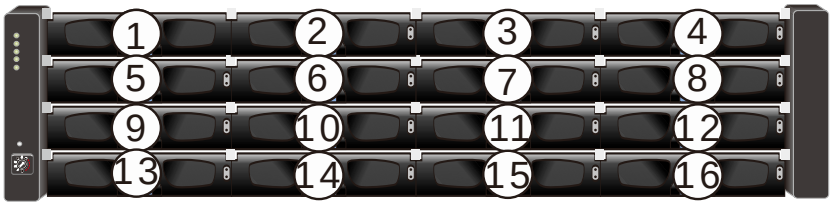
WARNING

Be careful not to warp, twist, or contort the drive tray in any way (e.g., by dropping it or resting heavy objects on it). If the drive bay superstructure is deformed or altered, the drive trays may not fit into the drive bay.

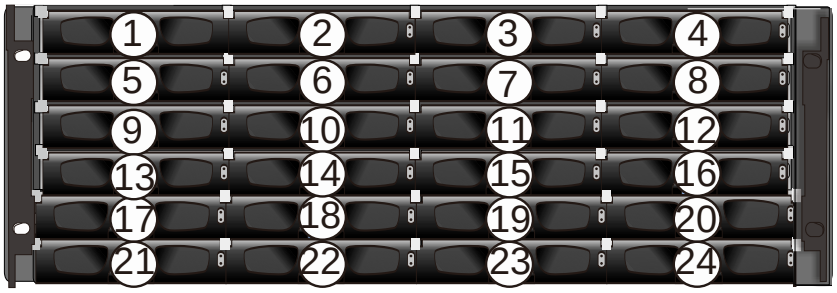
Drive bays are arranged as four bays wide by three, four or six bays high. The drive bays are numbered from left to right and from top to bottom.



2U



3U

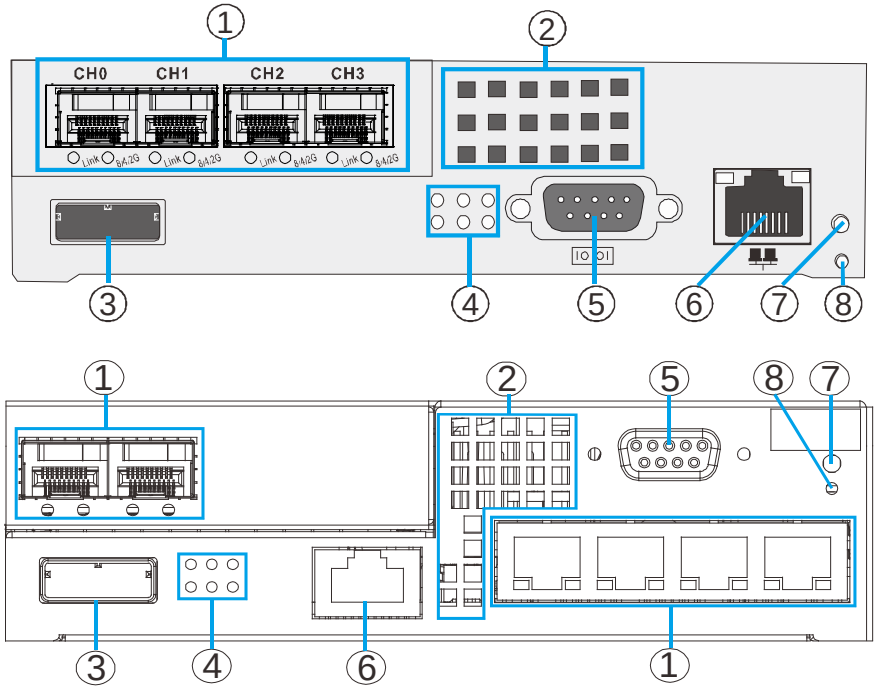


4U

Rear Panel Components

Controller Module of RAID Models

Designation	Description	Designation	Description
1	Host ports	**5**	Serial port
2	Convection holes	**6**	Ethernet management port
3	SAS expansion port	**7**	Restore default button
4	Controller status LED	**8**	Restore default LED



The controller on the dual controller models also features a **C**ache **B**ackup **M**odule (CBM), consisting of a **B**attery **B**ackup **U**nit (BBU) and **F**lash **B**ackup **M**odule (FBM). The CBM and its components may be optional items for some systems.

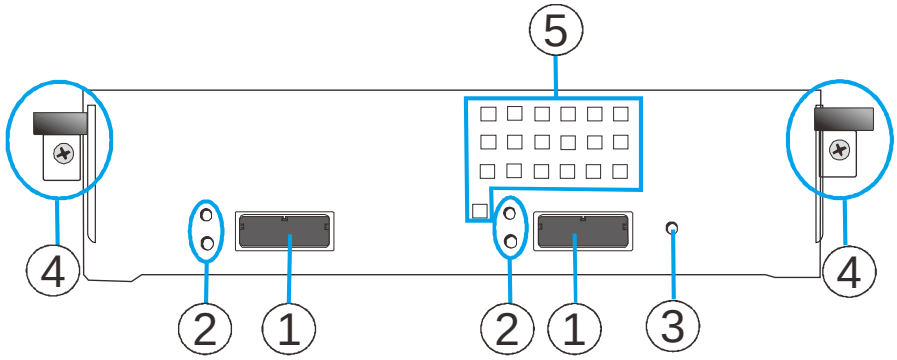
The controller module contains no user-serviceable components except when users are installing/ upgrading the cache memory or installing/replacing a CBM, the controller module should never be removed or opened.

WARNING

The only time you should remove the controller is to install/replace the memory modules, CBM or a failed controller. The RAID controller is built of sensitive components and unnecessary tampering can damage the controller.

Controller Module of JBOD Models

The expansion JBOD controllers features SAS expansion ports **(1)**, SAS expansion port status LEDs **(2)**, controller status LEDs **(3)**, extraction levers and retention screws **(4)** and convection holes* **(5)**.



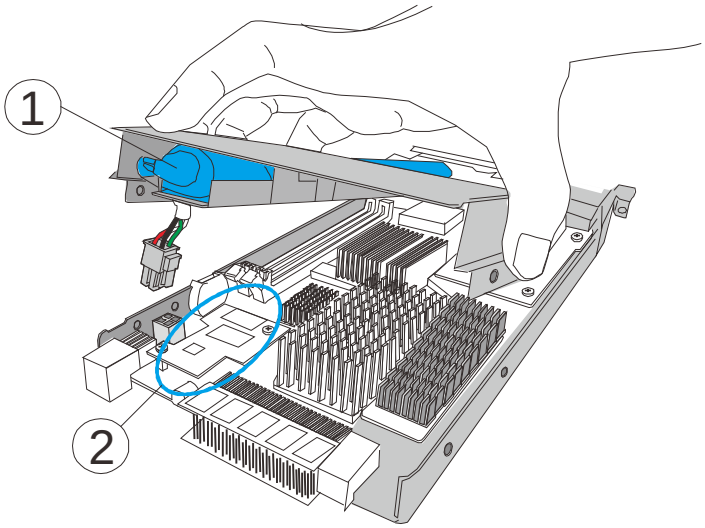
The expansion controller contains a circuit board within a metal canister, interfaced through hot-swap docking connectors at the back-end. Two SAS wide ports on the interface faceplate connect to a managing RAID system or other JBODs.

WARNING

The only time you should remove the controller is to replace a failed controller. The controller is built of sensitive components and unnecessary tampering can damage the controller.

Cache Backup Module (CBM) for RAID Models

The Cache Backup Module (CBM), located inside the controller, consists of a battery backup unit (BBU) **(1)** and flash backup module (FBM) **(2)**. The CBM can sustain cache memory after a power failure. The use of a CBM is highly recommended in order to safeguard data integrity. If you are using the single controller models and would like to install a CBM, refer to CBM Installation.



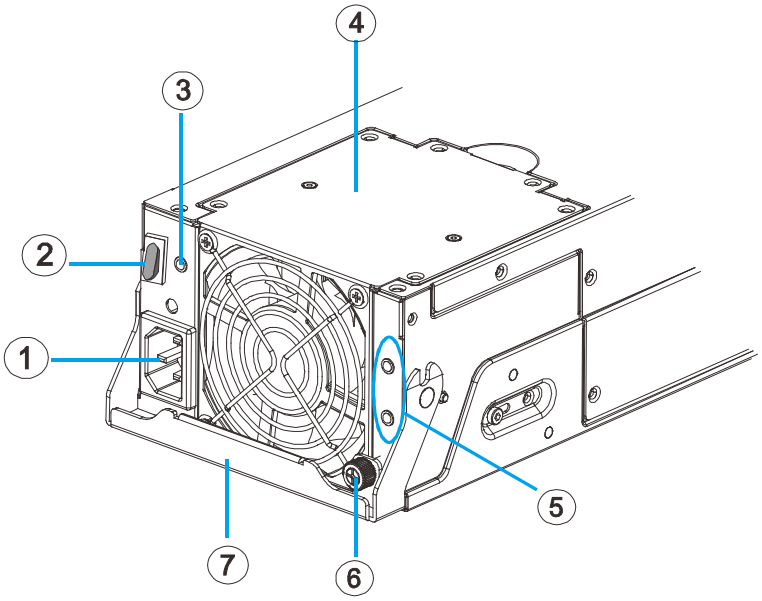
For dual controller systems, the Cache Backup Module may be a standard feature pre-installed into the controller and an optional accessory for single controller models. The Battery Backup Unit (BBU) can be serviced by the user but the Flash Backup Module (FBM) is not serviceable by the user.

NOTE

The BBU is only charged partially when shipped. Therefore, after powering on the system the BBU will start charging to its full capacity. It normally requires approximately twelve hours for the battery to be fully charged. If the battery is not fully charged after twelve hours, there may be a problem with the BBU and you should contact your system vendor immediately. You can also check the status of the battery module via SANWatch or the firmware (please refer to respective manuals).

2U and 3U RAID Systems PSU & Cooling Module

The 2U and 3U RAID systems come with two redundant, hot-swappable PSUs. Each PSU has a power socket **(1)**, power switch **(2)**, PSU status LED **(3)**, cooling module **(4)**, cooling module status LEDs **(5)**, retention screw **(6)** and an extraction handle **(7)**.



The cooling modules can operate at three rotation speed settings. Under normal operating conditions, the cooling fans run at the low speed. Under the following conditions, cooling fans raise their rotation speed to increase the airflow:

- Component failure: if a cooling module, PSU, or a temperature sensor fails.
- Elevated temperature: if the temperature breaches the upper threshold set for any of the interior temperature sensors.
- During the system initialization stage, the cooling fans operate at high speed and return to low speed once the initialization process has completed and no erroneous condition detected.

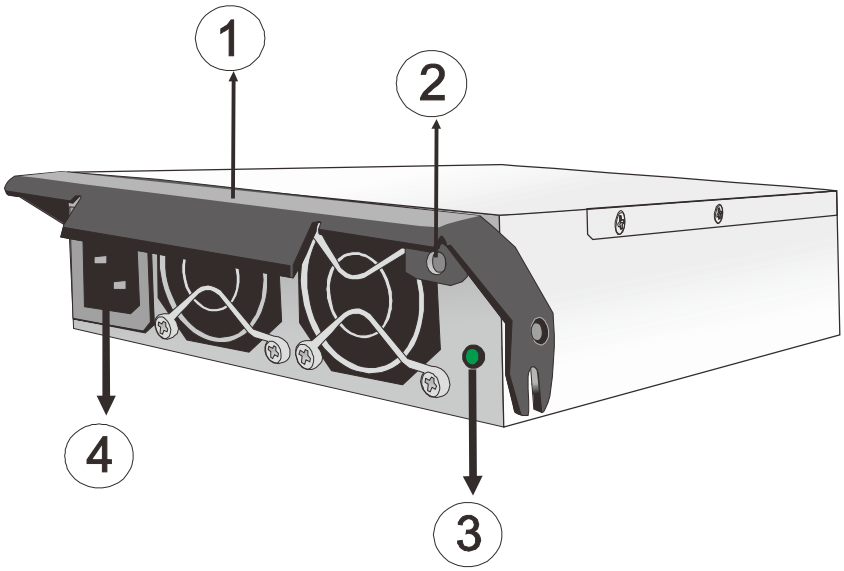
NOTE

There are two upper temperature thresholds: one for event notification and the other for triggering higher fan rotation speed. The preset-value for event notification can be changed using the firmware-embedded configuration utility, while the fan speed trigger cannot be changed. Refer to the Firmware Operation Manual for details.

4U RAID Systems PSU

The 4U RAID systems are equipped with three (3) redundant and hot-swappable load-sharing PSUs at the rear section of the chassis. The PSU is housed in a 1U canister containing both the power supply and dedicated cooling modules.

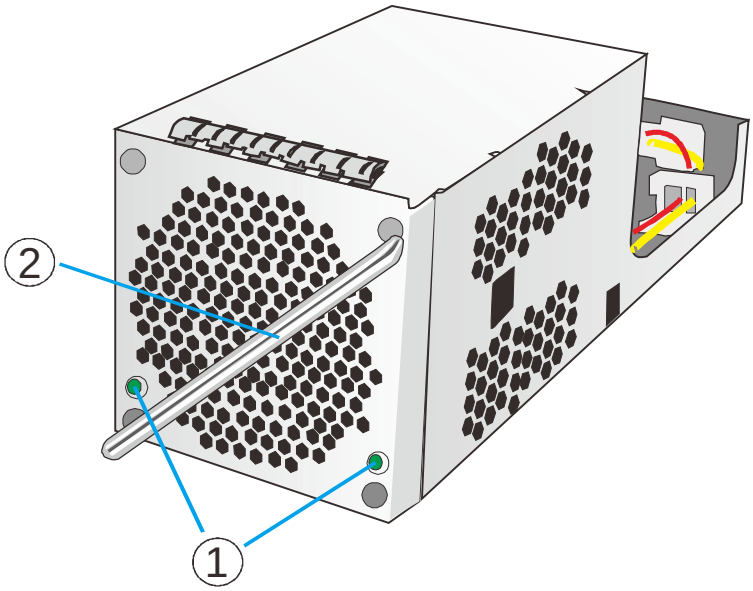
The PSU has an extraction handle **(1)**, retention screw location **(2)**, PSU status LED **(3)** and a power socket **(4)**.



4U RAID Systems Cooling Module

There are two cooling modules at the rear that ventilate the enclosure. The cooling fans operate at two fan speeds. When the system is operating normally, the cooling fans operate at the lower speed. If a system module fails or when one of the temperature thresholds has been exceeded, the cooling fans automatically raise their rotation speeds to draw more airflow.

The cooling module has two cooling module fan status LEDs **(1)** and an extraction handle **(2)**.



System Monitoring Features

There are a number of monitoring approaches that provide the operating status of individual components.

Expansion Enclosure Support

Monitoring:

A managing RAID system is aware of the status of JBOD components including those of:

- Expander controller (presence, voltage and thermal readings)
- PSU
- Cooling module
- Enclosure thermal sensor
- Service (the Service signal to specify a specific enclosure)
- Disk drives

JBOD Identifier:

The managing RAID system will sound the alarm and deliver warning messages if there is a conflict between JBOD IDs.

If more than one JBOD is connected to the managing RAID system, each JBOD needs a unique enclosure ID set using the rotary switch on the LED panel. For example, the firmware automatically disconnects the second JBOD if it is connected online and comes with an ID identical to that of the first JBOD.

NOTE

The IDs for JBODs are #1 to #15. For details, please refer to JBOD connections.

Cooling Module Speed Adjustment:

If any of the detected temperature readings breaches the temperature threshold, the firmware running on the managing RAID system automatically raises the rotation speed of all cooling fans.

JBOD Enclosure Status Monitoring:

A RAID system, when connected with expansion JBODs, acquires the component status within other enclosures via a proprietary enclosure monitoring service using the in-band connectivity. No additional management connection is required.

I^2C bus

The detection circuitry and temperature sensors are interfaced through a non-user-serviceable I^2C bus. When JBODs are attached to RAID controllers, JBOD component status is reported through in-band protocols over expansion links that is managed by a proprietary enclosure service.

Firmware (FW) and SANWatch

Firmware: The firmware (FW) is preloaded and is used to configure the system. The FW can be accessed either through the front LCD keypad panel or a terminal emulation program running on a management computer connected to the system's serial port.

SANWatch: SANWatch is a browser-based graphical user interface (GUI) software that can be installed on a local/remote computer and accessed via the network. The manager communicates with the array via the connection of the existing host links or the Ethernet link to the array's Ethernet port.

Audible Alarms

The system comes with audible alarms that are triggered when certain active components fail or when certain controller or system thresholds are exceeded. Whenever you hear an audible alarm, it is imperative that you determine the cause and rectify the problem immediately.

Event notification messages indicate the completion or status of array configuration tasks and are always accompanied by two or three successive and prolonged beeps. The alarm can be turned off using the mute button on the front panel.

WARNING

Failing to respond when an audible alarm is heard can lead to permanent damage(s) to the system. When an audible alarm is heard, rectify the problem as soon as possible.

Hot-swapping

The system comes with a number of hot-swappable components that can be exchanged while the system is still online without affecting the operational integrity. These components should only be removed from the system when they are being replaced.

The following components can be user-maintained and hot-swappable:

- Controller module (dual-controller models)
- PSU (including cooling modules)
- Cooling modules (selected models)
- Hard drive

NOTE

Normalized airflow ensures sufficient cooling of the system and is only attained when all components are properly installed. Therefore, a failed component should only be removed when a replacement is available. For instructions on how to replace these hot-swappable components, please refer to System Maintenance.

Hardware Installation

This chapter describes how to install modular components, such as hard drives into the enclosure and CBM into the RAID controller enclosure.

NOTE

Installation into a rack or cabinet should occur **BEFORE** hard drives are installed into the system.

Installation Prerequisites

Static-free installation environment: The system must be installed in a static-free environment to minimize the possibility of electrostatic discharge (ESD) damage.

Component check: Before installing the system, check to see that you have received all the required components using the **Unpacking List** included in the package. If there are item(s) missing or appear damaged, contact your vendor for a replacement.

Hard drives: SAS/SATA hard drives must be purchased separately and be available prior to installing the system.

Cabling: All the cables that connect the system to the hosts must be purchased separately. Please refer to System Connection for sample topologies and configuration options. Contact your vendor or Infortrend for the list of compatible cables.

Memory modules: If you wish to change the pre-installed DIMM module, you can find DIMM replacement procedures in Replacing the Memory Module for RAID Models.

CBM: For single controller RAID systems, if you ordered a CBM as an additional component and wish to install CBM (BBU and/or FBM), the CBM should be installed prior to powering on the system.

Rack installation: The rack slide rails are optional accessories and should you need to install it, please refer to the Slide Rail Installation Guide section.

Make sure you are aware of the related positions of each plug-in module and interface connector.

Cables must be handled with care and must not be bent. To prevent emission interference within a rack system and accidental cable disconnection, the routing paths must be carefully planned.

Installation Procedures Overview

Following all the instructions provided below can minimize system installation time. Detailed, illustrated instructions for each component are given in the following sections.

1. **Unpack:** Unpack the system and confirm all components have been received against the Unpacking List.
2. **Rack/Cabinet installation:** If the system is going to be installed in a rack or cabinet, it should be installed prior to installing the hard drives. Installing the system into a rack or cabinet requires at least two people due to its weight. If you need to install the slide rails that came with the system, please go here.
3. **Install CBM (if necessary)**: Install the CBM onto the controller if you purchased it as an additional item.
4. **Install hard drives:** Separately purchased SAS/SATA hard drives must be individually installed into the drive trays.
5. **Install drive trays:** After the hard drives have been installed into the drive trays, you can install the drive trays into the enclosure (install trays **AFTER** the enclosure has been mounted onto the rack).
6. **Cable connection:** Use the supplied power cords to connect the system to main power. It is recommended to connect power cords to separate and independent power sources (different circuit breakers for redundancy).
7. **Power up:** Once the components have been properly installed and all cables are properly connected, you can power up the system and configure the RAID array.

Unpacking the System

Compare the **Unpacking List** included in the shipping package against the actual package contents to confirm that all required materials have arrived.

Box contents

For detail content(s), please refer to the unpacking list that came with the system.

The accessory items include a serial port cable, screws, **Quick Installation Guide**, a CD containing the **SANWatch** management software and its manual and **Firmware Operation Manual**, and a product utility CD containing the **Installation and Hardware Reference Manual** (this document).

Preinstalled Components

Shown below are the components pre-installed in the system:

- Controllers
- LCD/LED front panels
- Chassis ears with plastic caps
- DIMM module for RAID models
- CBM (dual controller systems, please refer to Cache Backup Module (CBM) for RAID Models)
- PSUs including cooling modules

Components to Be Installed

You must install the following components:

- The enclosure itself (please refer to the Slide Rail Kit Installation Guide)
- Hard drives
- Drive trays
- Cabling
- CBM, if purchased as an upgrade (single controller systems, please refer to Cache Backup Module (CBM) for RAID Models)

Installing Hard Drive

Installation of hard drives should only occur after the enclosure has been rack-mounted!

Hard Drive Installation Prerequisites

Hard drives are separately purchased and when purchasing hard drives, the following factors should be considered:

Capacity (MB/GB): Use drives with the same capacity. RAID arrays use a "least-common-denominator" approach, meaning the maximum capacity used in each drive for composing a RAID array is the maximum capacity of the smallest drive. Therefore it is recommended to use large storage capacity hard drives.

WARNING

Even hard drives by the same manufacturer, of the same model, and claiming the same rated capacity may actually carry different block numbers meaning that their capacity may not be exactly the same.

When configuring hard drives into a RAID array, you may use a slightly smaller capacity as the "**Maximum Disk Capacity**" in each individual hard drive. The configuration option can be found in the interface-specific firmware manual that came with your enclosure.

Profile: The drive trays and bays of the system are designed for 3.5" hard drives.

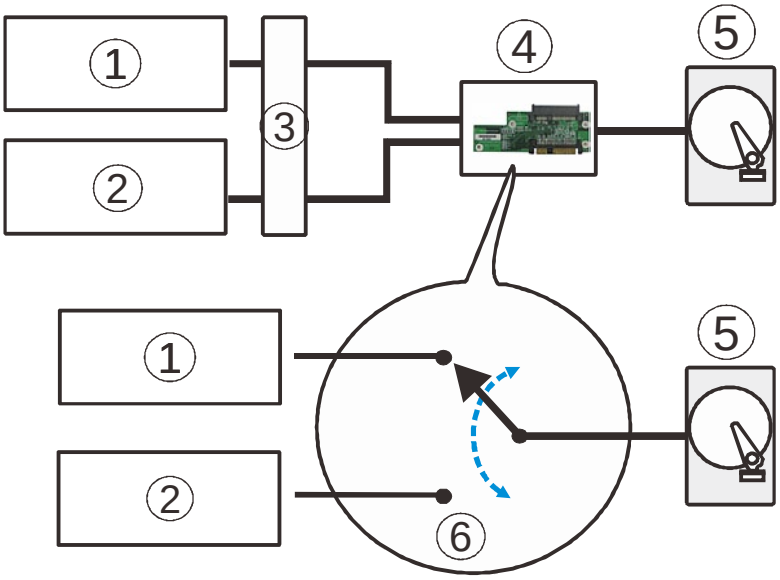
Drive type: The system uses SAS (3Gbps or 6Gbps), SATA and Nearline 3.5" hard drives. Please ensure that you purchase the correct hard drives.

NOTE

If you use a dual-controller RAID system and prefer using SATA hard drives in the enclosure or in the attached JBODs, make sure you also purchase MUX kits.

MUX Board:

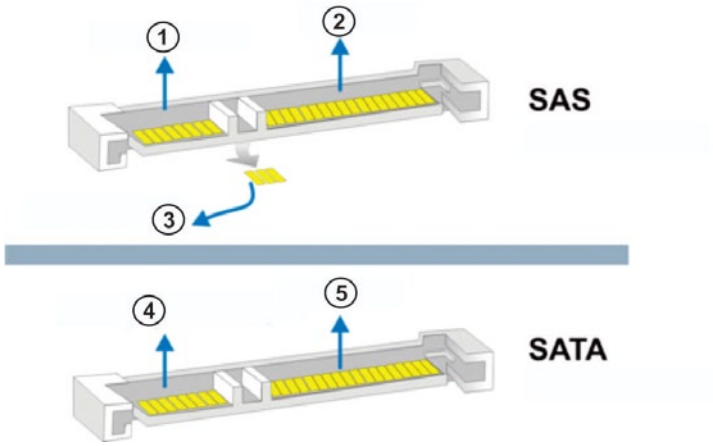
Shown below, controller A **(1)** and controller B **(2)** is connected to the backplane **(3)**. With a MUX board **(4)** paired to the hard drive **(5)**, data signals is able to switch between controllers A and B signal ports (indicated by the blue arrow / dotted line). Under normal circumstances, controller B signal port is in standby mode **(6)**.



MUX Kit Port Selector Mechanism

SAS Interface

The SAS interface features a dual-ported connectivity with pins on both sides of its connector that include SAS primary links **(1)**, power link **(2)** and underneath it, the SAS secondary links **(3)**. The SATA drives have only one port that includes the SATA physical links **(4)** and the power link **(5)**. In a redundant-controller system, the MUX-enabled drive trays must be separately purchased and applied. The single-controller JBODs do not require MUX kit.



Dual-ported SAS and Single-port SATA Connectors

WARNING

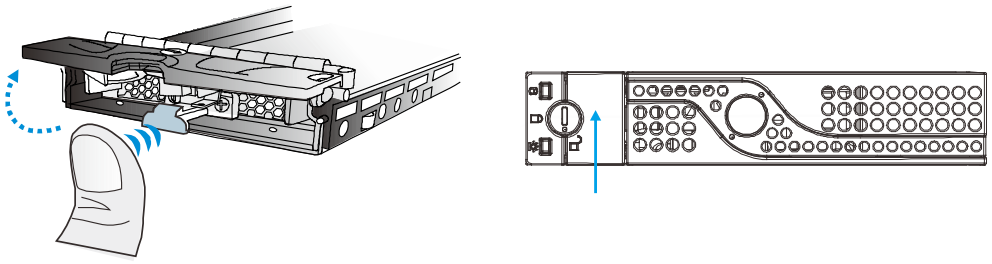
The hard drives and drive trays should only be installed into the system after rack mounting. If the hard drives are installed first, the system will be too heavy to handle and the possible impact during installation may damage your hard drives.

Handle hard drives with extreme care and observe all ESD prevention methods when installing drives.

Only use screws supplied with the system package. Longer screws may damage the drive.

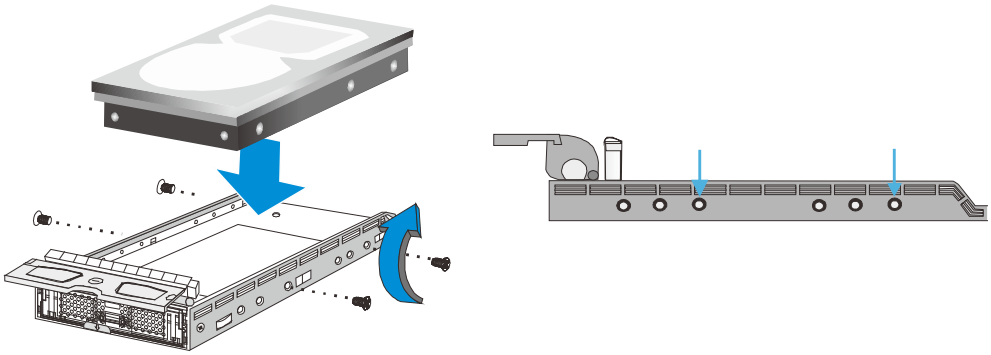
Installing the Hard Drive into Drive Tray

Open the bezel by pressing the release button and gently pull out the tray.

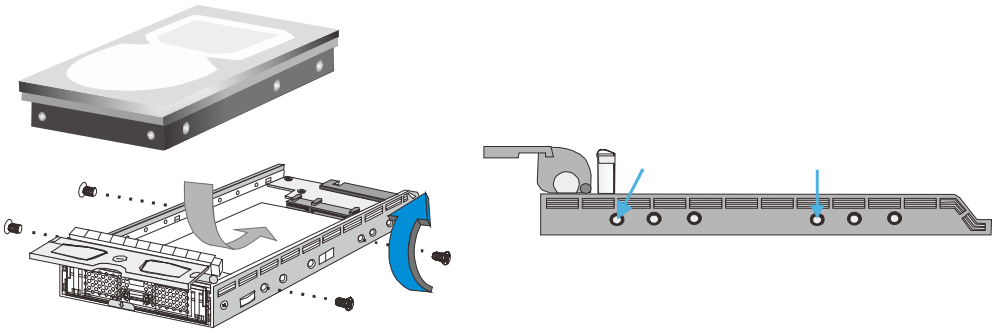


Place the hard drive into the drive tray, making sure that the interface connector is facing the open side of the drive tray and its label side facing up.

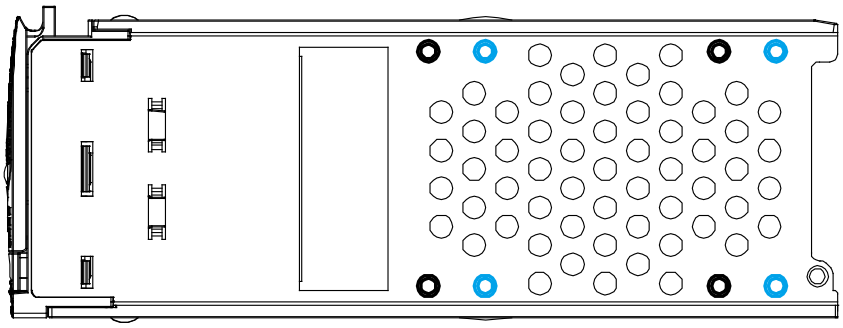
If you have a MUX board and you want to install a SAS drive, the MUX board should be removed.



Installing a Hard Drive without a MUX Board (SAS drives)



Installing a Hard Drive with a MUX Board (SATA drives)



- **2.5 inch SAS hard drive**
- **2.5 inch SATA hard drive (MUX board should already be installed)**

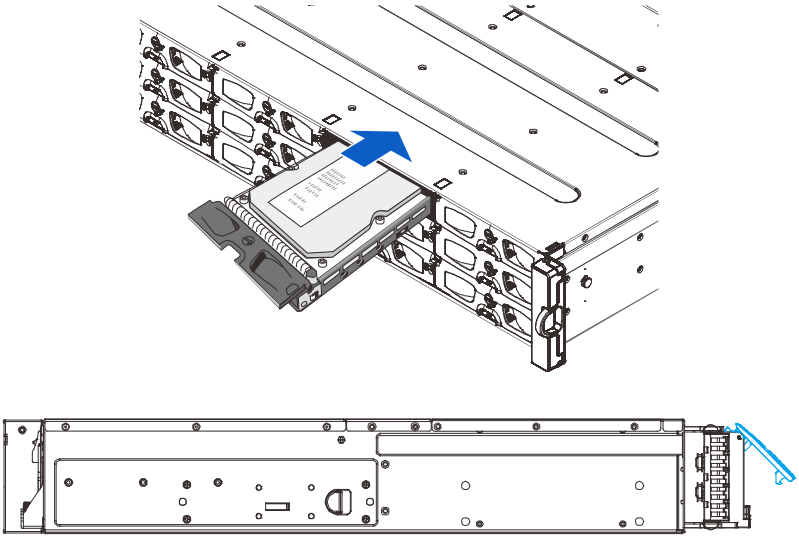
Adjust the drive location until the mounting holes in the drive tray are aligned with those on the hard drive. Secure the drive with four of the supplied flat-head screws.

Installing the Hard Drive Tray into the Enclosure

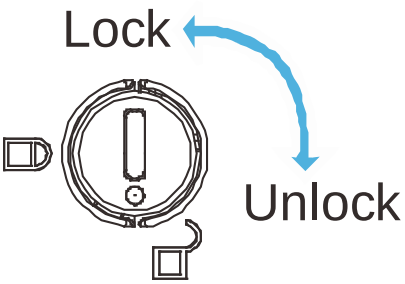
Once the hard drives have been installed in the drive trays, install the drive trays into the system.

> WARNING
>
> Each drive bay must be populated with a tray even if it does not contain a hard drive. With a bay empty, ventilation will be disrupted and the system will overheat.

With the hard drive tray bezel opened, align and insert the tray into the enclosure.



Once fully inserted, close the tray and use a small-size flat blade screwdriver to turn the bezel lock from unlock to the lock position.



Installing CBM for RAID Models

The CBM consists of a battery backup unit (BBU) and flash backup module (FBM). The CBM can sustain cache memory in the event of a power failure or in the extremely unlikely event of both PSUs failing at the same time. The use of a CBM is highly recommended in order to safeguard data integrity. The CBM is an optional item for the single-controller model and can be purchased from your system vendor. The CBM has to be installed on the controller before rack-mounting the system.

NOTE

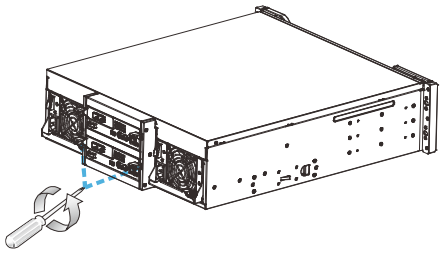
Dual controller model's BBU and FBM are pre-installed!

Dual controller systems come with the BBU pre-install in the system while the FBM may be default or an optional item. For details, please refer to Cache Backup Module (CBM) for RAID Models.

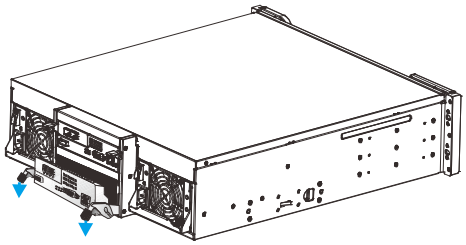
For single controller models, the CBM (BBU + FBM) will be pre-installed for you if you ordered it as a part of the system. If you purchase the CBM afterwards as an upgrade component, please read and follow the instructions in this section carefully.

Removing the RAID Controller

Remove the RAID controller from chassis by loosening screws under the ejection levers.



Push the ejection levers downwards (**blue arrows**). The controller will ease out from chassis.

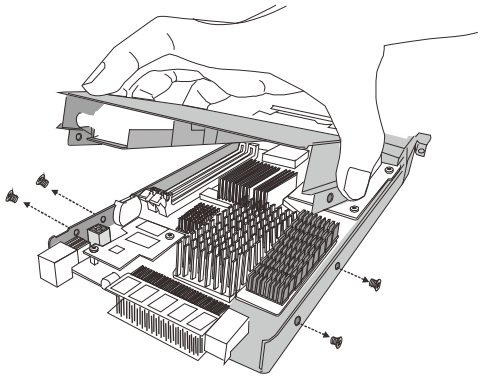


Please read the following sections on how to install the battery cell and flash backup module onto the controller module. Always place the controller on a clean, static-free surface and hold the controller only by its metal canister and never touch the circuit board or connector pins.

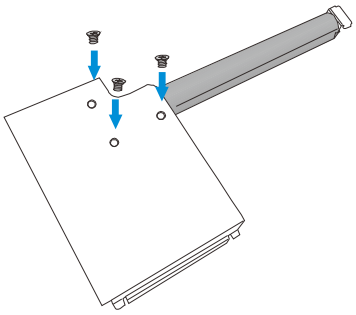
Installing the BBU

> NOTE
>
> If you need to replace the controller FBM, please contact your vendor.

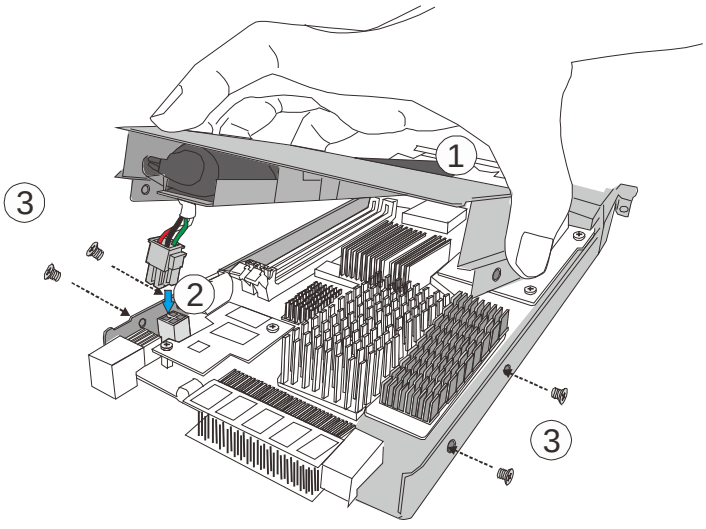
Remove the four screws and the top cover from the controller shown below.



Install the BBU to the top cover by securing the three screws.



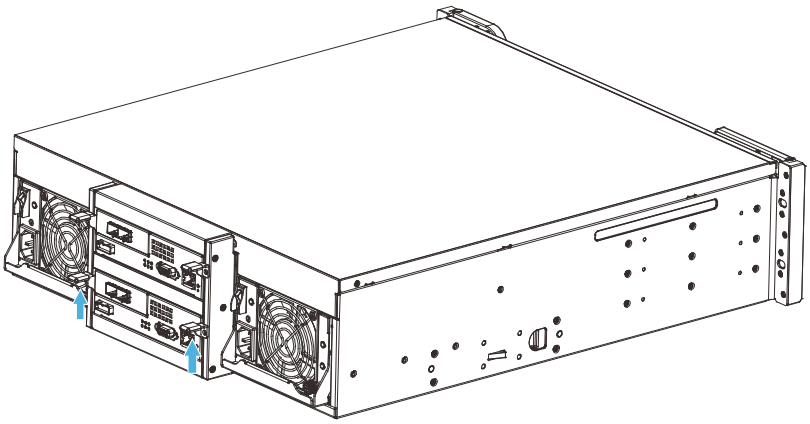
Insert the back end of the BBU **(1)** onto the controller, connect the BBU power cable **(2)** and secure the top cover with the BBU using the four screws **(3)** shown below.



Installing the RAID Controller

After completing the battery backup unit and flash backup module installation, the RAID controller can be re-inserted into the enclosure:

1. Insert the controller slowly into the module slot. When you feel the contact resistance, use slightly more force and then push both of the ejection levers upwards (indicated by the **blue arrows**) to secure the controller into chassis.
2. Secure the controller by fastening the two retention screws under the ejection levers.



NOTE

Installation of the CBM on the controller should occur **BEFORE** rack-mounting.

A new or replaced BBU takes at least 12 hours to charge to its full capacity.

Follow the procedures shown in Replacing the Controller Module to replace a faulty BBU with a new one in order to maintain fault-tolerant features.

System Connection

This chapter outlines the general configuration rules you should follow when cabling a storage system and introduces basic information about topologies. You can use these topologies or refer to them as a guide for developing your own unique topologies. A complete description of the power-on and power-off procedures is also given in this chapter.

General Considerations on Making Connections

When selecting the number of hard drives to be included in a logical drive, the host channel bandwidth and the mechanical performance of individual disk drives should be considered.

It is a good practice to calculate performance against the host port bandwidth when designing an application topology. As an example, if eight members are included in a logical drive and this logical drive is associated with a host ID (LUN mapping), the combined performance of this logical drive should approximate the channel bandwidth. If, for example, two 6-drive logical arrays are associated with two IDs residing on a single host channel, there may be a trade-off with performance.

If your system comes with dual controllers for a total of 8 host ports, it is recommended that you obtain more disk drives by attaching a JBOD so that you can create 4 or more 6-member logical drives. These 4 logical drives leverage the bandwidth of all 8 host ports.

There are other considerations:

- For example, a spare drive carries no data stripes and will not contribute to disk-level performance. Refer to the documentation for your hard drives for performance data.
- When cabling, follow all the specifications. Pay attention to signal quality and avoid electronic noise from adjacent interfaces, e.g., do not lay power cords on optical cables.
- The disk drives in the same logical array should have the same capacity, but it is preferred that all the drives within a chassis have the same capacity.
- Disk drives in the same logical drive should have the same capacity, but it is

preferred that all the disk drives within a chassis have the same capacity. Tiered storage configuration is supported, e.g., 150GB SAS drives in your RAID enclosure and 750GB SATA drives in JBODs. However, you should not include both SAS and SATA drives in a logical drive.

- A spare drive should have a minimum capacity that is equivalent to the largest drive that it is expected to replace. If the capacity of the spare is less than the capacity of the drive it is expected to replace, the controller will not proceed with the failed drive rebuild.
- When rack-mounted, leave enough slack in the cables so that they do not bend to a diameter of less than 76mm (3 inches).
- Route the cables away from places where it can be damaged by other devices, e.g., foot traffic or fan exhaust.
- Do not over-tighten or bend the cables.

Host-Side Topologies

The primary concern for configuring host-side topologies is to avoid points of failure. It is therefore recommended that the host ports be connected to at least two HBAs. It is also preferable to apply corresponding host port type switches (eg. use Fibre switches for Fibre host ports).

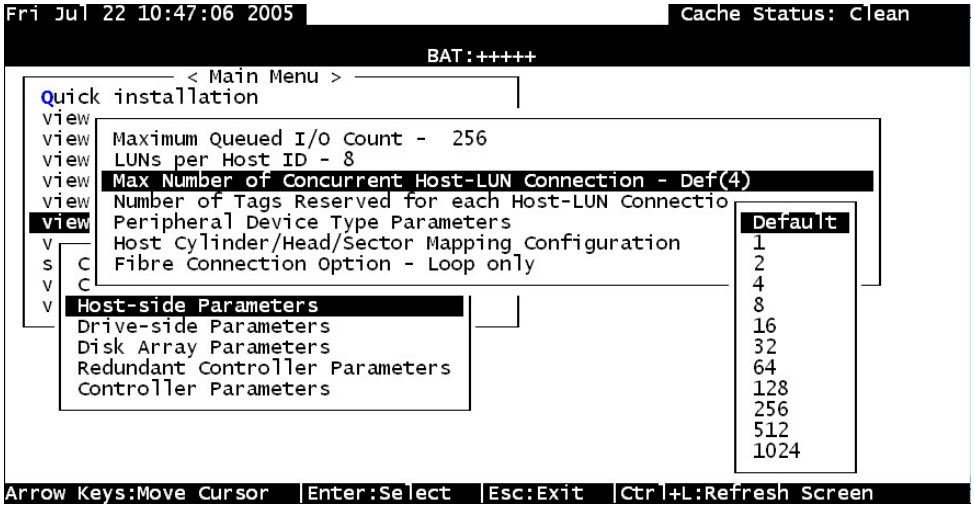
NOTE

In order to manage the fault-tolerant data paths and to optimize data throughput on multiple data paths, it is necessary to apply EonPath multipath software or utilities such as Linux Device Mapper.

Host-Side Parameters

It is STRONGLY recommended that users use the default settings with their system. Should you feel the need to adjust your host-side parameters, please consult on-site technical personnel or technical support.

Maximum Concurrent Host LUN Connection (“Nexus” in SCSI)



The "Max Number of Concurrent Host-LUN Connection" menu option is used to set the maximum number of concurrent host-LUN connections.

Maximum concurrent host LUN connection (nexus in SCSI) is the arrangement of the controller internal resources for use with a number of the current host nexus.

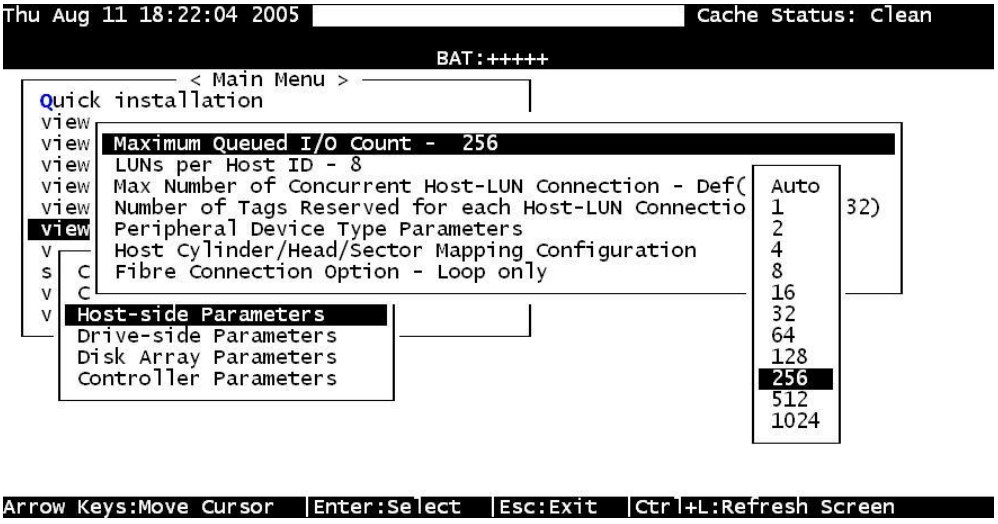
For example, you can have four hosts (A, B, C, and D) and four host IDs/LUNs (IDs 0, 1, 2 and 3) in a configuration where:

- Host A accesses ID 0 (one nexus).
- Host B accesses ID 1 (one nexus).
- Host C accesses ID 2 (one nexus).
- Host D accesses ID 3 (one nexus).

These connections are all queued in the cache and are called four nexus.

If there is I/O in the cache with four different nexus, and another host I/O comes with a nexus different than the four in the cache (for example, host A accesses ID 3), the controller returns busy. This occurs with the concurrent active nexus; if the cache is cleared, it accepts four different nexus again. Many I/O operations can be accessed via the same nexus.

Maximum Queued I/O Count



The "Maximum Queued I/O Count" menu option enables you to configure the maximum number of I/O operations per host channel that can be accepted from servers. The predefined range is from 1 to 1024 I/O operations per host channel, or you can choose the "Auto" (automatically configured) setting. The default value is 256 I/O operations.

The appropriate "Maximum Queued I/O Count" setting depends on how many I/O operations the attached servers are performing. This can vary according to the amount of host memory present as well as the number of drives and their size. But usually, optimum performance results from using the "Auto" or "256" settings.

For more information, please refer to the Firmware Manual that came with your system.

Fibre-Host RAID Connections

The Fibre Channel standard allows optical connections. Optical cables can be used over longer distances and have been shown to be more reliable. Due to the demands of high transfer rates, optical cables are preferred for 8/4Gbps fiber connectivity. Optical cables are also less susceptible to EMI.

The Fibre host ports connect to Fibre Channel host adapters (HBA) that feature a 8Gbps transfer rate, SFP interface, support for full-duplex transfer and best come with a 64-bit/133MHz PCI-X or PCI-E interface. Please contact your vendor for the latest certified items.

WARNING

All Fibre cables are sensitive and must be handled with care. To avoid interference, the cable routing path must be carefully planned and the cables must not be bent.

Fibre-Host Components (including 10GB iSCSI)

WARNING

Lasers can be hazardous and may cause permanent eye damage or blindness, and therefore must be treated with respect and used with caution. Never look directly at lasers while it is turned on.

Auto speed detection

Speed auto-detection is specified by the Fibre Channel standard. If a 16Gbps port is connected to an 8Gbps port, it will negotiate down and run at 8Gbps. If there are 16Gbps ports on both ends of the link, the link will run at 16Gbps.

SFP / SFP+ transceivers

An SFP transceiver converts electrical data signals into light signals and transfers them transparently via optical fiber. A transceiver provides bi-directional data links, a laser transmitter (for fiber optic cables), LC connector, and a metal enclosure to lower the EMI.

Other beneficial features of a typical SFP transceiver include a single power supply, low power dissipation, and hot-swap capability. It is also important that any transceiver you use meets the FC performance and reliability specifications.

WARNING

The SFP transceiver contains a laser diode featuring class 1 laser. To ensure continued safety, do not remove any covers or attempt to gain access to the inside of the product. Refer all servicing to qualified personnel.

FC port dust plugs

Each FC port comes with a dust plug. Remove these dust plugs only when you are ready to insert an SFP transceiver.

Please contact your vendor for a list of compatible components!

Fibre-Host Topologies

The Fibre Channel standard supports three (3) separate topologies. They are point-to-point, Fibre Channel Arbitrated Loop (FC-AL), and fabric switch topologies.

- Point-to-Point: Point-to-point topology is the simplest topology. It is a direct connection between two (2) Fibre Channel devices.
- FC-AL: This is the most common topology currently in use. Fibre Channel devices are all connected to a loop. Each device is assigned an arbitrated loop physical address (AL_PA). The FC-AL supports 124 devices in a single loop.
- Fabric: The fabric topology supports up to 224 Fibre Channel devices. This topology allows multiple devices to communicate simultaneously. A Fibre switch is required to implement this topology.

NOTE

If a logical drive can be accessed by different servers, file locking, FC switch zoning, port binding, and multipath access control will be necessary.

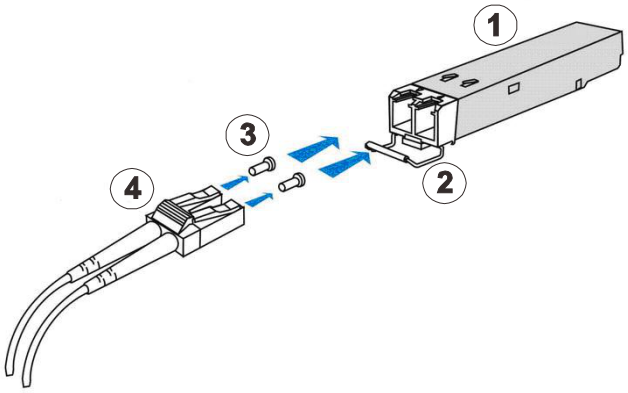
Fibre Cabling

Following are steps that should be completed with cabling:

1. Maintain a configuration plan. In addition to cabling topologies and list of networking components, the plan can also include firmware and software maintenance details.
2. Confirm that you have a Fibre Channel cable that loops 6-inch or longer.
3. Ensure proper airflow and keep cables away from ventilation airflow outlets.

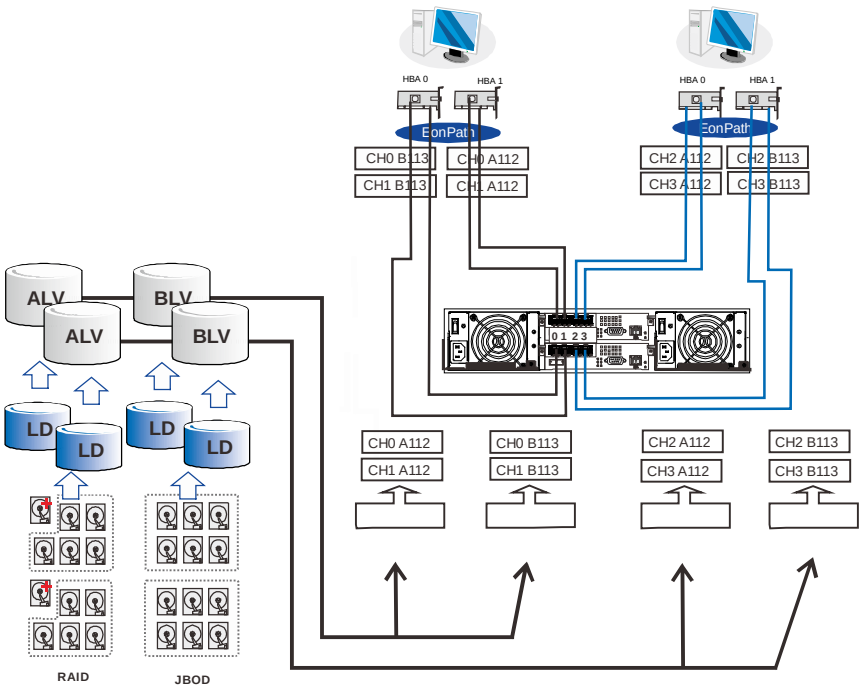
Cabling steps:

1. Remove the SFP module **(1)** from its static-protective package.
2. Remove the dust plug **(2)** from the SFP transceiver module.



3. Insert the SFP module into the system host ports. The module will click into place.
4. Remove the two protective caps **(3)** from the LC-to-LC type cable. Save the protective caps for future use
5. Connect a LC-to-LC type cable **(4)**.
6. Carefully insert the cable into an SFP module that is already on the system. The cable connector is keyed and will click into place.
7. Remove the protective caps on the other end and connect this end to an SFP transceiver module on a Fibre Channel switch port or a Fibre Channel host bus adapter (HBA) port.

Simple End-to-End Connection



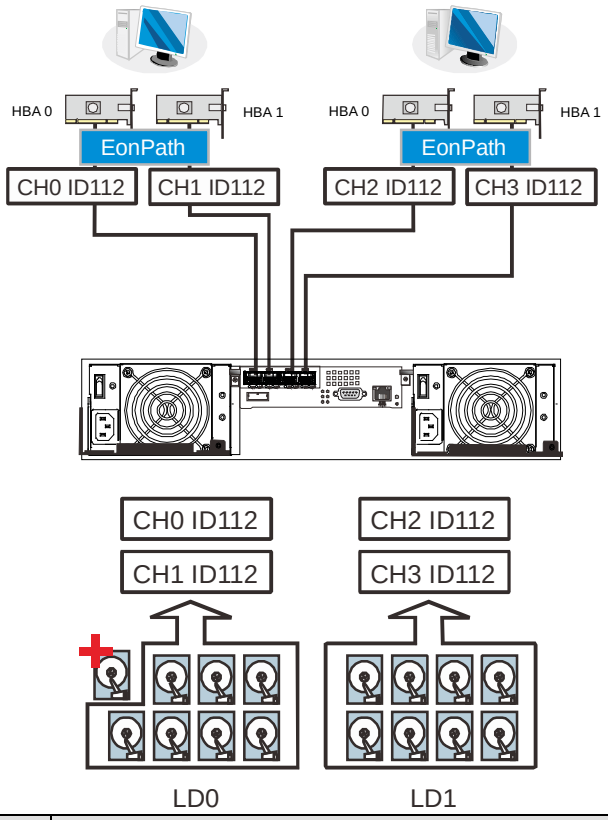
Channels	Controller A	Controller B
Host	CH0, CH1, CH2, CH3	CH0, CH1, CH2, CH3
Configuration Information		
RAID controller	2	
Host server	2	
Data path connection	Fault-tolerant data paths.	
Host channel bandwidth	6400 MB/s	

Above is an example demonstrating simple end-to-end connections with each SFP port connected to a host adapter. Multiple logical drives, logical volumes, and logical partitions can be created and each mapped to the corresponding host channel ID/LUN combinations.

Note that EonPath multipath software or Linux Device Mapper is necessary for controlling and optimizing the access to logical drives via multiple data paths.

DAS (Direct-Attached) Connection

> NOTE
>
> If a logical drive can be accessed by different servers, file locking, FC switch zoning, port binding, and multipath access control will be necessary in order to avoid access contention.



Channels	Controller A
Host	CH0, CH1, CH2, CH3
Configuration Information	
RAID controller	1
Host server	2
Data path connection	Simple end-to-end connections with fault-tolerant pairs
Host channel bandwidth	3200 MB/s

With more disk drives over the SAS expansion links, you can create more logical

groups of drives. These logical drives using more host channel IDs or LUN numbers.

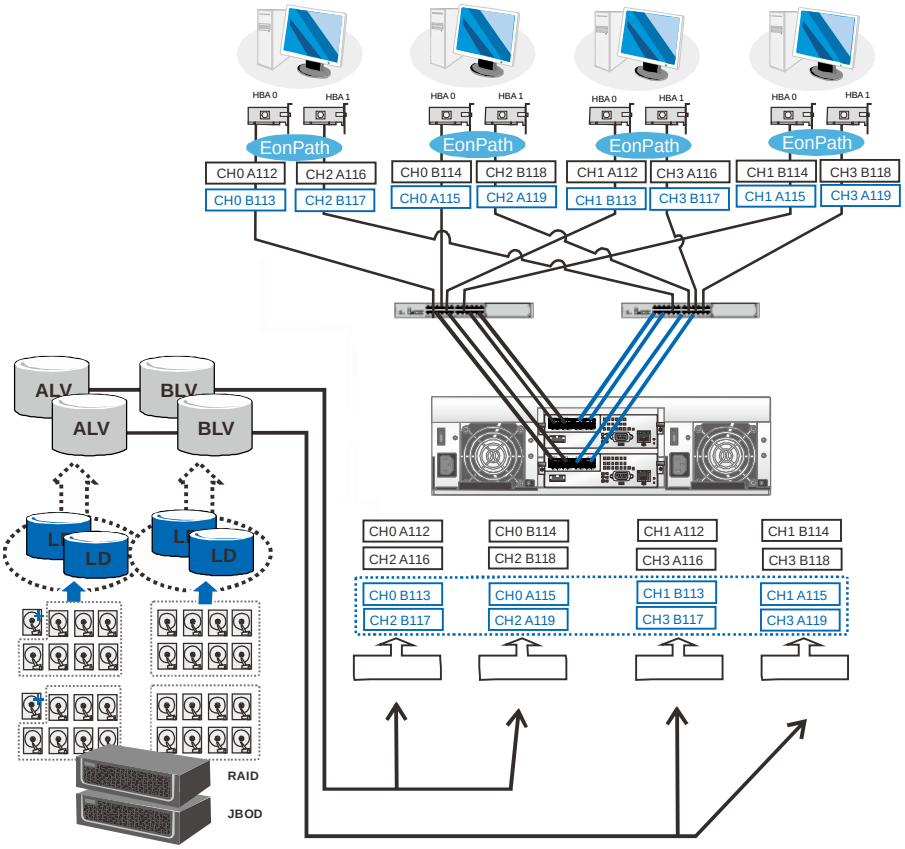
If a server has multiple data paths to a RAID system, a multi-path software is necessary, e.g., the EonPath driver.

The two logical drives in the above drawing cannot leverage the full computer power of the system. You may attach 1 or 2 more JBODs to acquire more end-to-end performance.

Switched Fabric Connection (Dual-Controller)

NOTE

A logical partition presented through LUN Mapping can be seen by all servers across SAN. Make sure you have access control such as file-locking, switch zoning, port binding, etc., to avoid access contention.



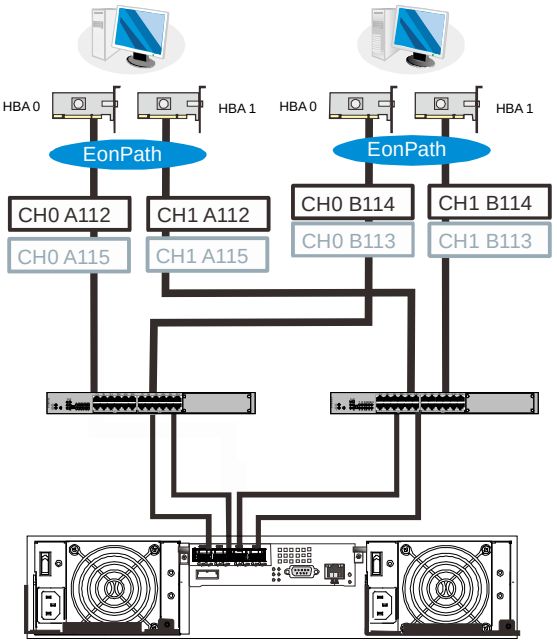
Channels	Controller A	Controller B
Host	CH0, CH1, CH2, CH3	CH0, CH1, CH2, CH3
Configuration Information		
RAID controller	2	
Host server	4 (or more via FC switches)	
FC switch	2 (or 1 into 2 zones)	
Data path connection	Fault-tolerant paths	
Host channel bandwidth	6400 MB/s	

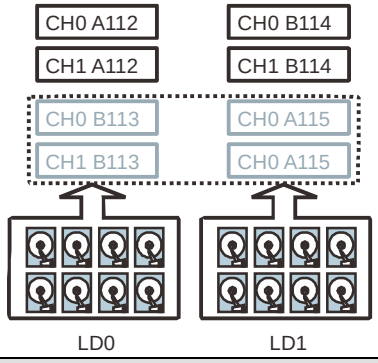
Channel link bypass is provided on external FC switches. Each of the application servers shown in the diagram is equipped with two HBAs with FC links via two FC switches to the SFP ports on individual RAID controllers.

You can refer to the ID tags on the host links to see the related logical volume mapping and cable links routing paths. Through the cable links illustrated above, the configuration can withstand a failure of a single component, e.g., RAID controller, HBA, cable, or FC switch.

Each logical partition is redundantly mapped to multiple host channel IDs in an AAPP (Active-Active-Passive-Passive) configuration. Logical volumes are managed either by the controller A or by the controller B. The Passive IDs will only become functional when a single controller fails in the system. The EonPath driver is a must on the application servers. The driver communicates with system firmware and performs load balance and automated distribution of I/Os across preferred paths (Active IDs on data paths). TPGS (Target Port Group Service) is supported so that I/Os are routed to the preferred paths.

Switched Fabric Connection (Single-Controller)





Channels	Controller A
Host	CH0, CH1, CH2, CH3
Configuration Information	
RAID controller	1
Host server	4
Data path connection	Data paths are attached to one or more FC switches. SAN management measures, such as switch zoning and port binding, should be taken to avoid multiple servers from accessing the same LUN.
Host channel bandwidth	3200 MB/s

Above is the sample drawing showing connections with each SFP port connected to FC switches and then to host adapters. See logical associations in the drawing for LUN mapping details.

Use Enclosure-specific spares to prevent a spare drive from participating in the rebuild of a logical drive on another enclosure.

You can refer to the ID tags on the host links to see the related LUN mapping and cable links routing paths.

Each logical partition is mapped to a single host channel ID. If you prefer path redundancy, you can map a logical partition to IDs residing on two different channels. You will then need the EonPath driver to manage access through two different HBA ports. The driver communicates with system firmware and performs load balance and automated distribution of I/Os.

If multiple servers can “see” a mapped volume, you will need to avoid access contention using file locking software, port binding, or zoning feature by FC switches, which limits the access from host to a specific LUN. If you have two servers in a clustered configuration, access control will be performed by the clustering software.

SAS-Host RAID Connections

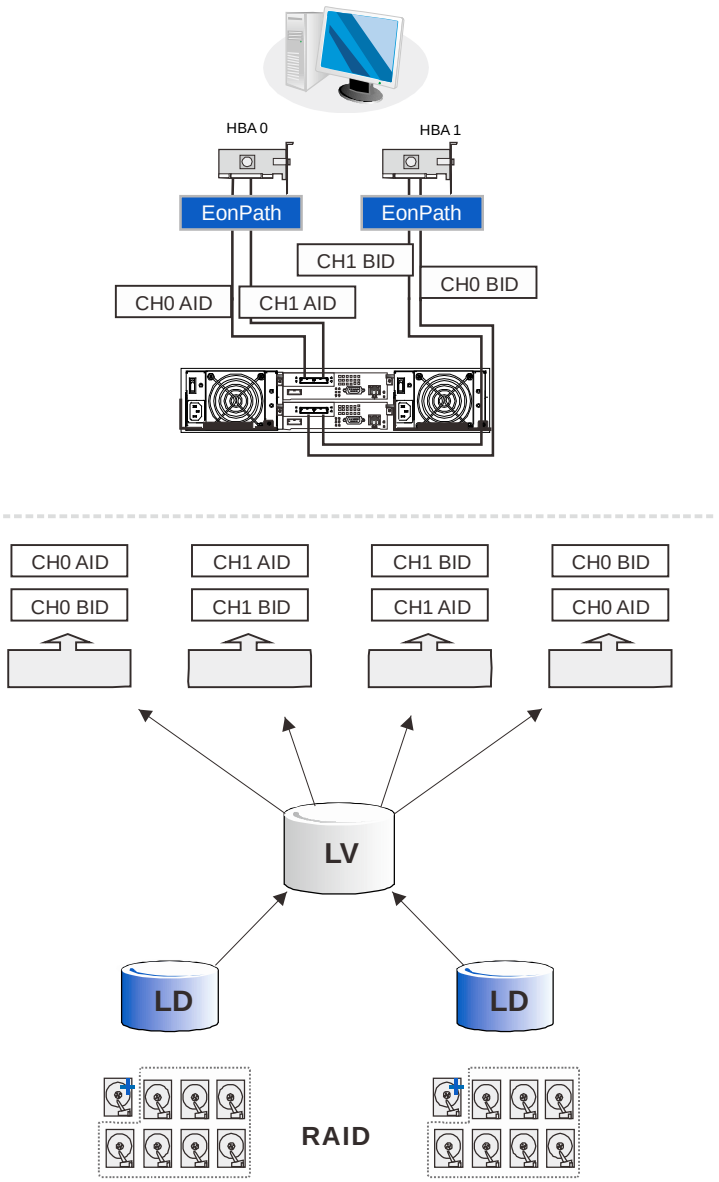
One SFF-8088-to-SFF-8088 host link cable is included per controller. You can contact your vendor to purchase additional cables if you need more than the included one.

The cables (28AWG x 8 pairs) are characterized by 100ohm, black colors, UL-approved, lead-free, 50, 120 or 170cm cable lengths; connectors can be secured to chassis receptacle using latching mechanism.

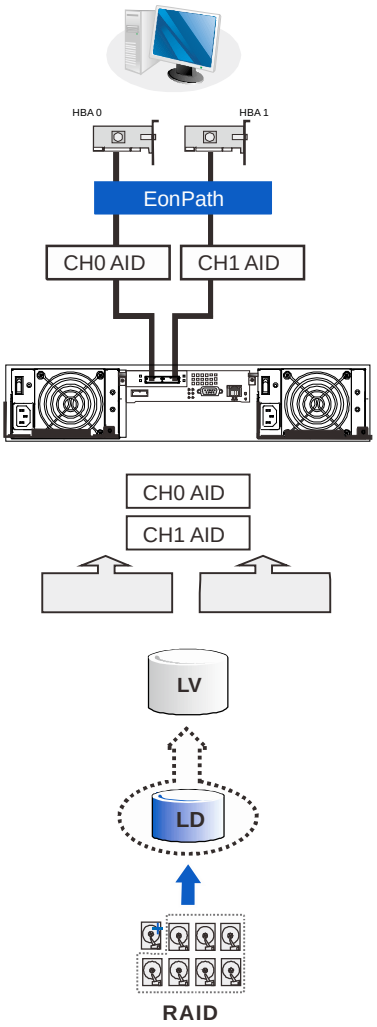
WARNING

All SAS cables are sensitive and must be handled with care. To prevent interference within a rack system, the cable routing path must be carefully planned and the cables must not be bent.

DAS (Direct-Attached Storage) Connection with Redundant Host Path



Dual-controller models



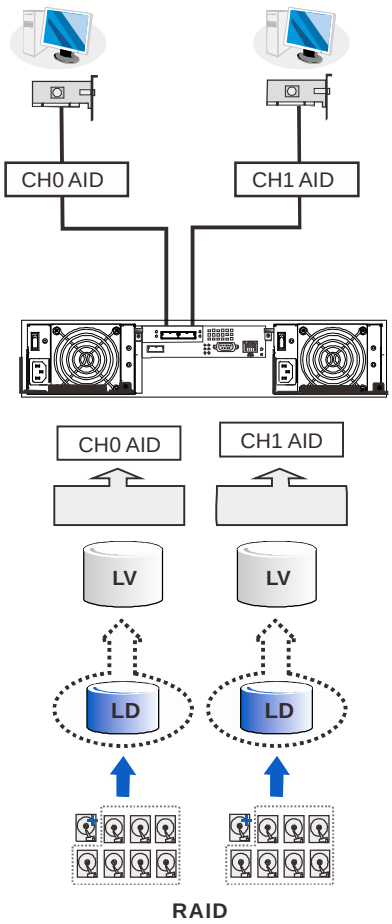
Single-controller models

With more hard drives over the SAS expansion links, you can create more logical groups of drives. Avail these logical partitions using more LUN numbers.

NOTE

EonPath multipath software or Linux Device Mapper is necessary for controlling and optimizing the access to logical drives via multiple data paths.

DAS (Direct-Attached Storage) Connection to Two Servers



NOTE

If you would like a LUN (a logical partition) to be accessed by multiple hosts, file locking or multipath access control will be necessary.

iSCSI-Host RAID Connections

Ethernet cable requirements:

- Ethernet cables are user-supplied. Cat5e shielded STP type network cables or better performance types (important for meeting the requirements imposed by emission standards).
- Straight-through Ethernet cables with RJ-45 plugs.
- Use of cross-over cables can also be automatically detected and re-routed for a valid connection.

Connection types:

- Directly to iSCSI initiators (software or hardware) or via Gigabit Ethernet switches.
- To servers equipped with iSCSI HBA – preferably a hardware TOE (TCP/IP Offload Engine) card, and then to client stations with an Ethernet NIC or iSCSI HBA.
- The system presents its logical volumes through SCSI-like IDs and LUNs. These RAID volumes then appear as iSCSI targets through the network.

NOTE

Even though iSCSI initiator software is a cost-effective way of building an iSCSI SAN, software initiator adds additional workload to the server CPU. It is recommended to apply iSCSI HBAs that come with TCP/IP offload engines in order to reduce overhead.

Network & Host Connection Topologies

The iSCSI host ports connect to Ethernet network devices and iSCSI initiators that comply with the IETF iSCSI standard (RFC 3720). Network connection of the iSCSI ports is flexible. The use of network connecting devices, subnet, Name Servers, or iSCSI management software can vary from case to case. In the following sections, configuration diagrams will be provided to illustrate the possible uses of the EonStorDS system in an iSCSI network.

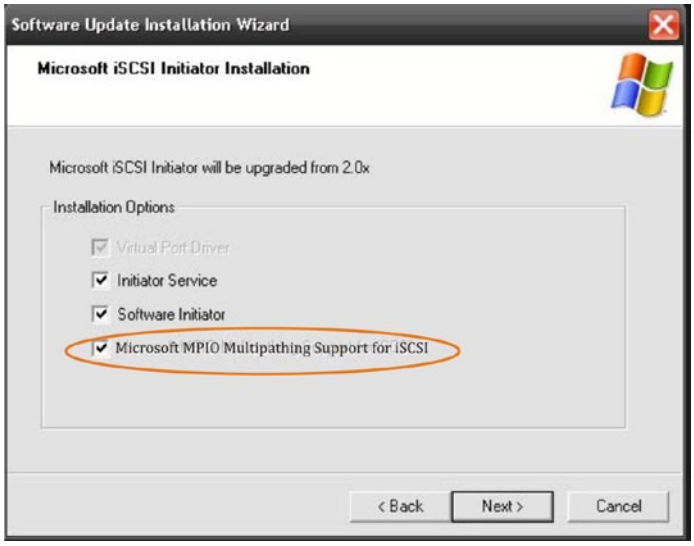
Note that host NIC ports and the storage system's iSCSI host ports must be configured into the same subnet.

Please note the following:

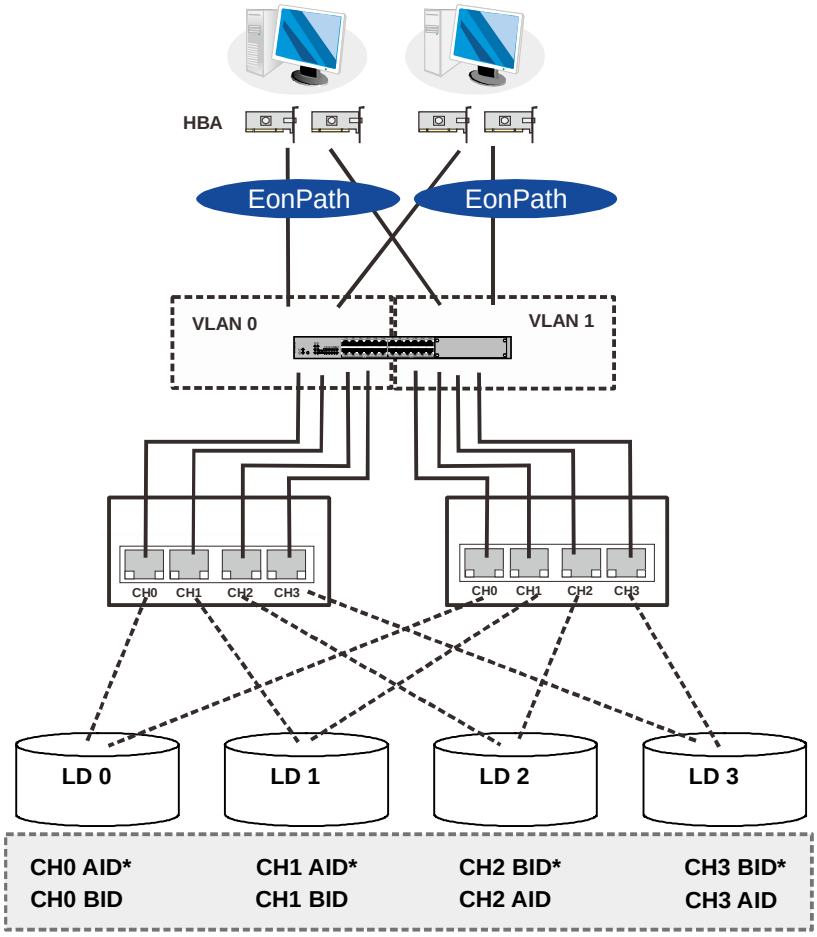
- Use the Ethernet management port for management purposes only, i.e., SANWatch or telnet console. This Ethernet management port is not used for I/O transactions.
- Configurations such as subnet or Virtual LAN can separate iSCSI host links, decrease overhead, and eliminate the impact of link failure.
- Multiple arrays or logical partitions can be created and made available separately through different IDs or LUN numbers on the host ports. Usually, a RAID5 logical drive of eight (8) members often brings optimal array performance.

NOTE

If you are using Microsoft's software initiator, please de-select the embedded MPIO function when installing the software, as the MPIO selection creates conflicts with EonPath driver.



High Availability IP SAN with Redundant RAID Controller



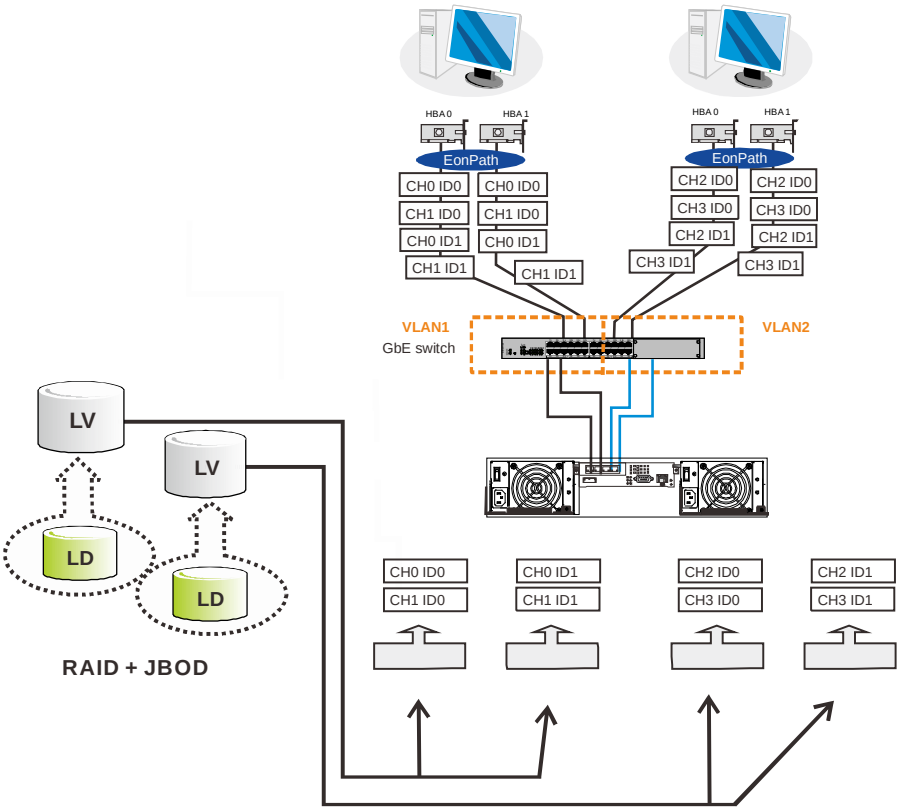
Component	Description
RAID system	iSCSI RAID managed by redundant RAID controllers, with a total of 8 host ports
HBA	iSCSI initiators, preferably PCI-E TCP/IP offload engine (TOE) capable cards
GbE cables	GbE network cables
GbE switch	Ports divided into 2 virtual LANs to separate access from host to targets.
Software	EonPath to manage the fault-tolerant paths with failover/ failback and load balance capabilities. Use EonPath multipath software so that your operating system can identify alternate paths to the same logical drive.
RAID	**Remote replication functionality is not supported**

configuration	**using this configuration. For remote replication setup, please refer to "High Availability IP SAN (Remote Replication Enabled) or "High Availability IP SAN with Port Trunk (Remote Replication Enabled)".** 4 logical drives (each has 4 member drives; for better performance, you can include drives from JBOD) LD0 mapped to CH0 AID and CH0 BID; LD assigned to controller A LD1 mapped to CH1 AID and CH1 BID; LD assigned to controller A LD2 mapped to CH2 AID and CH2 BID; LD assigned to controller B LD3 mapped to CH3 AID and CH3 BID; LD assigned to controller B
*	LD assignment

NOTE

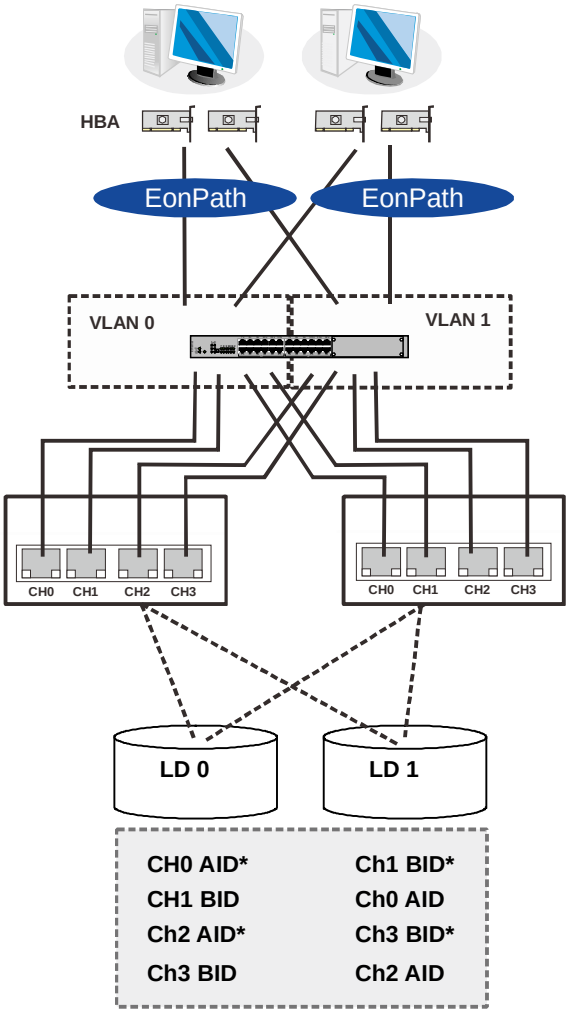
In the event of single controller failure, a logical drive is accessed through the host IDs managed by the alternate RAID controller. Host IDs and port IPs do not fail-over to the surviving controller. Therefore, the EonPath multipath driver is necessary for path redundancy and controller failover.

Single-Controller with Fault-Tolerant Path



Component	Description
RAID system	iSCSI RAID managed by a single controller, with 4 host ports
HBA or NIC	iSCSI initiators, preferably PCI-E TCP/IP offload engine (TOE) capable cards
GbE cables	GbE network cables
Software	EonPath to manage the fault-tolerant paths with failover/ failback and load balance
RAID configuration	4 logical partitions (created from 2 logical volumes) 2 Logical Volumes (each contains a logical drive) 2 Logical Drives * Each logical partition appears on two different host links for the purpose of fault tolerance. Use EonPath multipath software so that your operating system can identify alternate paths to the same logical drive.

High Availability IP SAN (Recommended Cabling Method for Remote Replication)



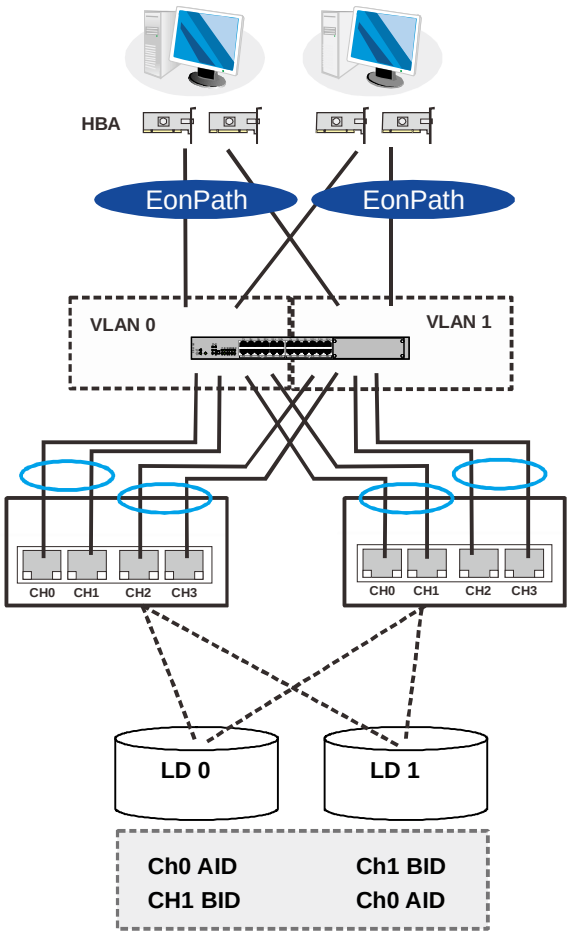
Component	Description
RAID system	iSCSI RAID managed by redundant RAID controllers, with a total of 8 host ports.
HBA	iSCSI initiators, preferably PCI-E TCP/IP offload engine (TOE) capable cards.
GbE cables	GbE network cables
GbE switch	Ports divided into 2 virtual LANs; both controllers are linked to both virtual LAN zones.
Software	EonPath to manage the fault-tolerant paths with failover/ failback and load balance. Use EonPath multipath software so that your operating system can identify

	alternate paths to the same logical drive.
RAID configuration	2 logical drives (each has 8 member drives). More logical drives can be created from drives in JBOD. LD0 mapped to CH0 AID, CH1 BID, CH2 AID and CH3 BID; **LD has to be assigned to both controllers A and B to enable remote replication.** LD1 mapped to CH1 BID, CH0 AID CH3 BID and CH2 AID; **LD has to be assigned to both controllers A and B to enable remote replication.**

NOTE

In the event of single controller failure, a logical drive is accessed through the host IDs managed by the alternate RAID controller. Host IDs and port IPs do not fail-over to the surviving controller. Therefore, the EonPath multipath driver is necessary for path redundancy and controller failover.

High Availability IP SAN with Port Trunk (Remote Replication Enabled)



Component	Description
RAID system	iSCSI RAID managed by redundant RAID controllers, with a total of 8 host ports
HBA	iSCSI initiators, preferably PCI-E TOE cards
GbE cables	GbE network cables; port-trunking indicated by the **blue circles**
GbE switch	Ports divided into 2 virtual LANs; both controllers are linked to both virtual LAN zones
Software	EonPath to manage the fault-tolerant paths with failover/ failback and load balance. Use EonPath multipath software so that your operating system can identify alternate paths to the same logical drive.
RAID	2 logical drives (each has 8 member drives). More

configuration	logical drives can be created from drives in JBOD. LD0 mapped to CH0 AID and CH1 BID; **LD has to be assigned to both controllers A and B to enable remote replication** LD1 mapped to CH1 BID and CH0 AID; **LD has to be assigned to both controllers A and B to enable remote replication**

JBOD Connections

A SAS host link cables are included per JBOD. If you need to purchase other cables or if you need other cable(s) of different length, please contact your vendor.

The cable features include: 28AWG x 8 pair, 100ohm, black, UL approved, lead-free, 50cm, 120cm, or 170cm cable lengths, and connectors that can be secured to chassis using thumb screws or latching mechanism.

WARNING

All SAS cables are sensitive and must be handled with care. To prevent interference within a rack system, the cable routing path must be carefully planned and the cables must not be bent.

Please contact your vendor for a list of compatible components!

SAS Expansion Links

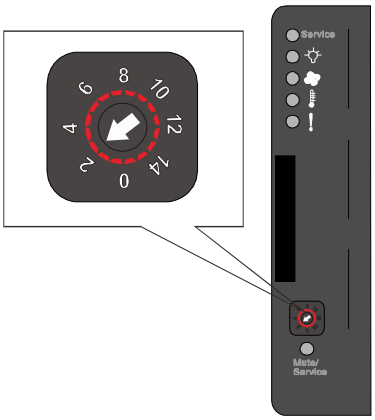
JBOD SAS Expansion Configuration

The SAS expansion port connects to expansion JBOD enclosures. For dual-controller systems, each expansion port connects a RAID controller to a corresponding JBOD controller making fault-tolerant links to different SAS domains.

The following principles apply to RAID and JBOD connections:

- Dual-controller RAID connects to dual-controller JBODs.
- Single-controller RAID connects to single-controller JBODs.
- A longer cable is available for making expansion links with a dual-controller configuration. A longer cable is required if connections to JBODs are made from two opposite directions. Routing through two different connections can avoid loss of data links if one enclosure fails in between.

There is a rotary ID switch on every expansion enclosure that is manually configured using a flat blade screwdriver.



Configuring enclosure IDs:

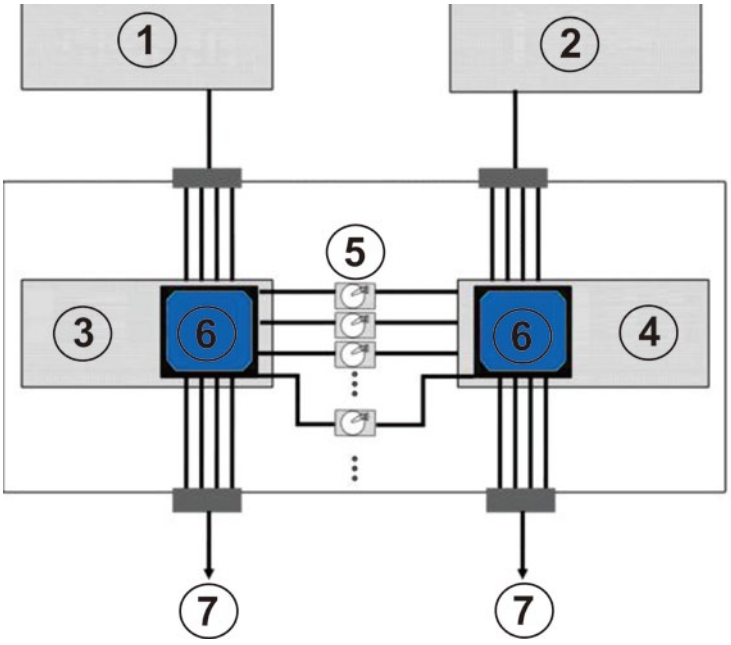
- The configurable IDs for JBODs are from 1 to 15. Usually the numbering starts from the one closest to the managing RAID enclosure.
- Make sure a unique ID is configured on each JBOD so that the SAS WWN addresses of disk drives can be properly assigned. RAID system firmware automatically manages these addresses.

Configuration Rules

Following are the rules for connecting SAS interfaces across RAID and JBOD enclosures:

- Fault-tolerant links in a dual-controller combinations: Corresponding to SAS drives' **dual-ported** interface, two physical links are available from each disk drive, routed across the backplane board, each through a SAS expander, and then interfaced through a 4x wide external SAS port.
- With data paths through separate SAS domains, access to disk drives can be continued in the event of a cable link or SAS JBOD controller failure.

Designation	Description	Designation	Description
1	RAID controller A	**5**	Dual-ported SAS drives
2	RAID controller B	**6**	Expander
3	JBOD controller A	**7**	To another JBOD
4	JBOD controller B		



- Fault-tolerant Links to SAS disk Drives
- SAS expansion cables will be available with the JBODs. Note that if many JBODs are connected, a longer SAS external cable (e.g., a 120cm cable) may be necessary for connecting a JBOD from the opposite direction

offering high redundancy.

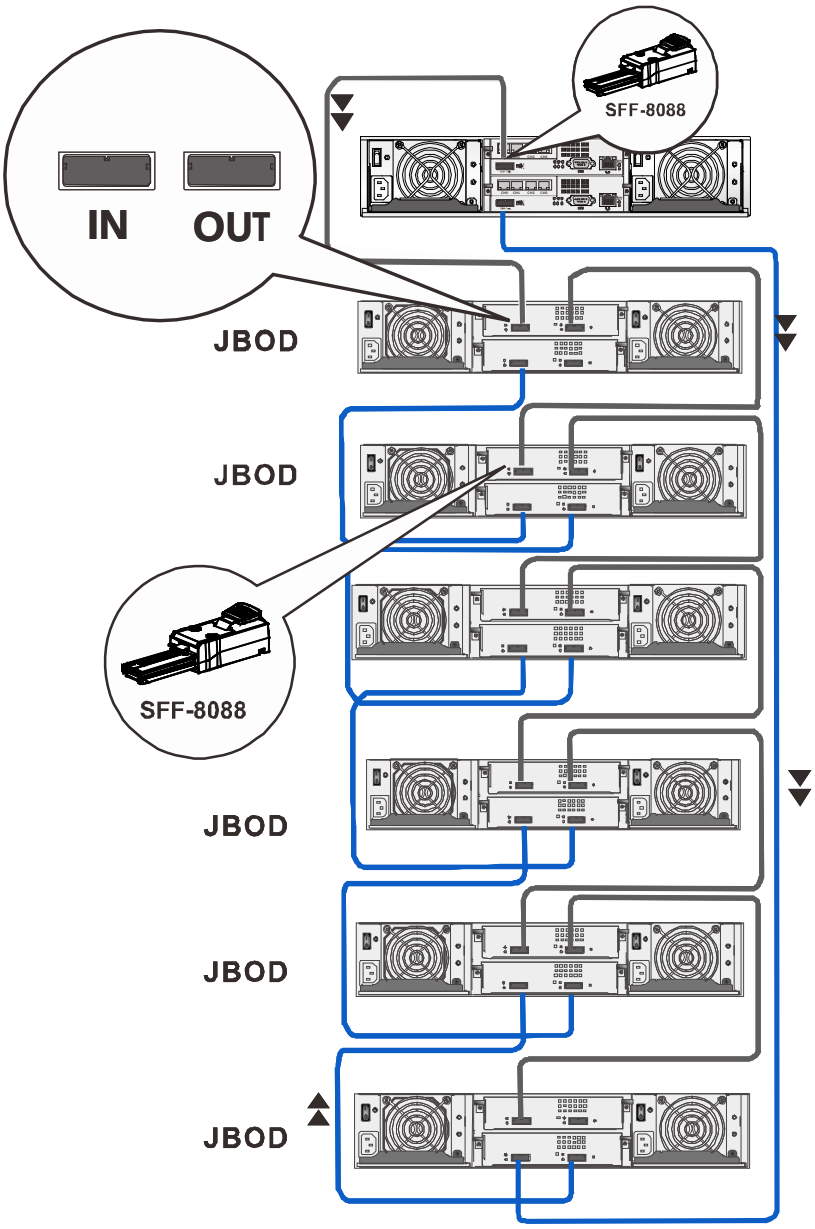
- One expansion link connects JBODs from RAID to the nearest JBOD, and then to the farthest JBOD. Another expansion link connects to the farthest JBOD from the opposite direction and then to the nearest JBOD.

- Each expander controller on the SAS JBOD controls a "**SAS Domain**" that connects one of the alternative interfaces on all of the disk drives in the enclosure. For example, one expander unit controls Domain A, and the other controls Domain B. In a fault-tolerant topology, the SAS external links always connect to the SAS ports on the same SAS Domain.

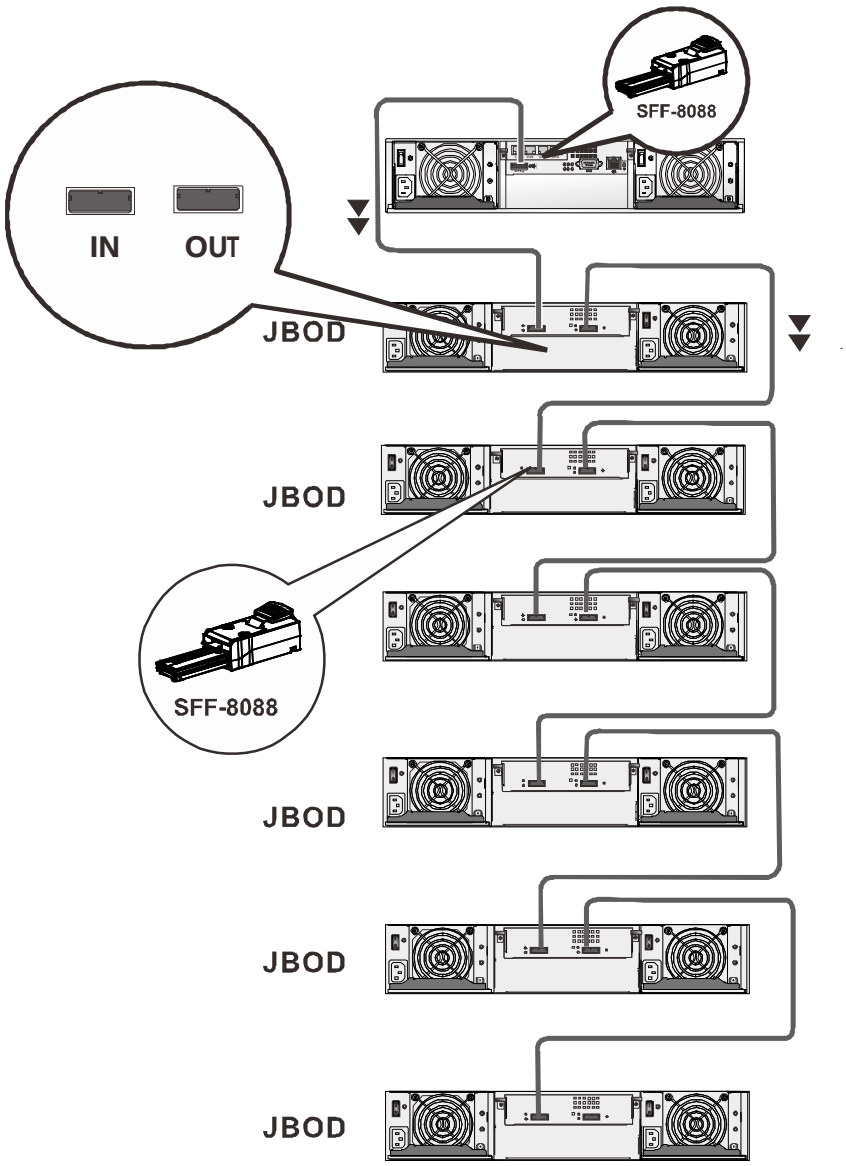
- The SAS Domains can be identified by the expanders' locations, i.e., upper controller slot (Controller A/Slot A) or the lower controller slot (Controller B/Slot B).

- On the RAID system, each RAID controller can be considered as managing a separate SAS Domain. With the help of the port selector mechanism on the MUX boards, the idea of SAS Domain applies even when SATA drives are used in a dual-controller JBOD.

Dual Controller Expansion Connection

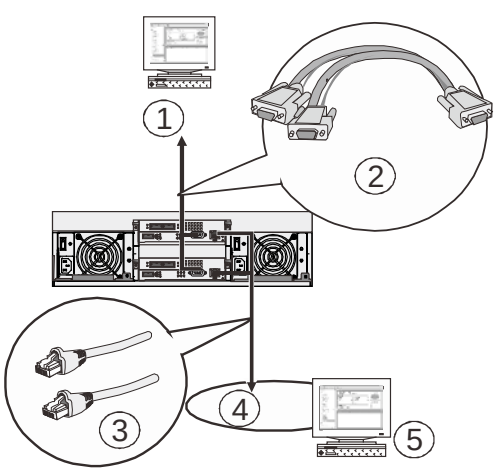


Single Controller Expansion Connections

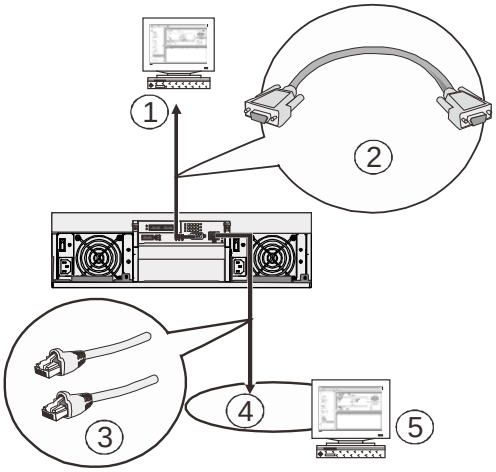


Management Console Connections

Designation	Description	Designation	Description
1	Serial port (for Telnet access)	**4**	Local area network
2	**Single controller**: DB9 male to female serial **Dual controller**: Y-cable	**5**	SANWatch/ telnet console
3	CAT5e LAN cable		



Dual controller management connection



Single controller management connection

Connecting RAID system to external consoles:

- Serial port: For dual-controller models, a Y-cable is provided in the package. For single-controller models, a standard DB9 straight cable should be supplied by the user (**NOTE**: null modem may be required if you are using a 3rd party cable).
- LAN port: A LAN cable should be supplied by the user.

The serial port's defaults are:

Baud Rate	38400
Data Bit	8
Parity	None
Stop Bit	1
Flow Control	Hardware

For TCP/IP connection and firewall configuration with a management station running SANWatch, please refer to SANWatch's online help or User's Manual. If your network environment is not running DHCP server protocols, a default IP, <10.10.1.1> can be used to access for the first time.

Power Connections

Once all hard drives have been properly installed and the I/O ports or management interfaces have been connected, the system can be powered on.

Checklist

BEFORE powering on the system, please check the following:

- **CBM:** Make sure the CBM has been properly installed before powering-on the system.
- **Hard drives:** Hard drives are correctly installed in the drive trays.
- **Drive trays:** All the drive trays, whether or not they contain a hard drive, have been installed into the system.
- **Cable connections:** The system has been correctly connected to host computer(s), management computers, or external networking devices.
- **Ambient temperature:** All system components have been acclimated to the surrounding temperature.

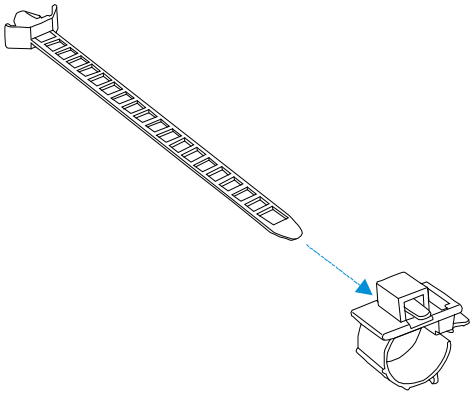
NOTE

Make sure you use the power cables provided that are at least 1.2 meters in length. **DO NOT** use extension cables as the power cables are designed to connect **ONLY and DIRECTLY** to relocatable power taps (RPTs) on server cabinets.

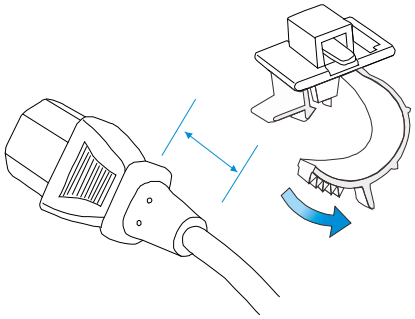
Connecting Power Cords

Use the included cable clamps to secure power cord connections.

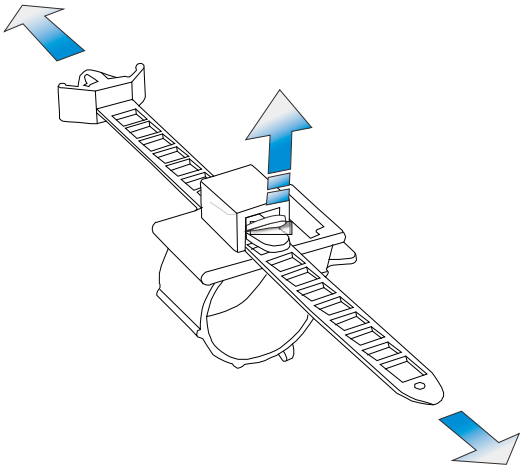
1. Remove power cords and cable clamps from the accessory boxes.
2. Combine cable strap with cable clamp.



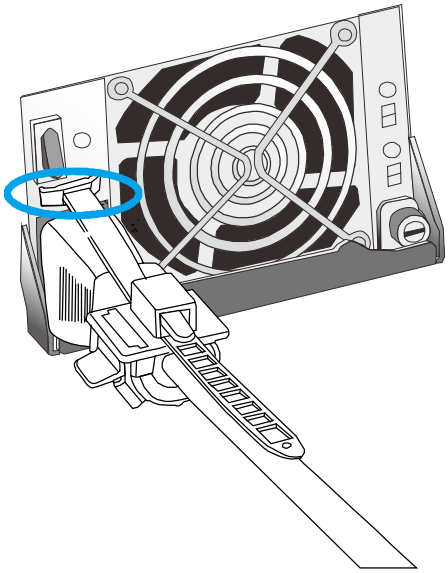
3. Attach cable clamps to the power cords by opening and enwrapping the plastic ring around the base of power cords.



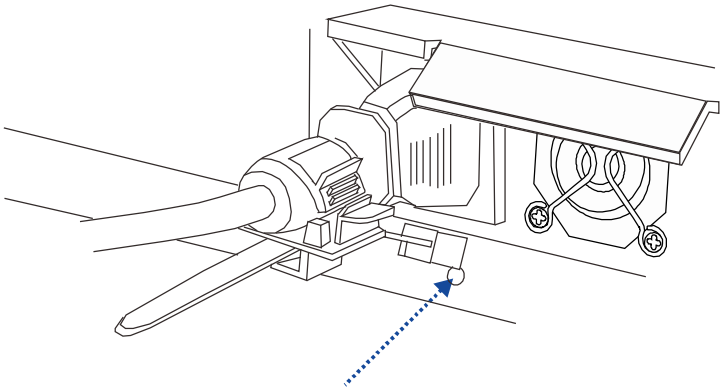
4. Adjust the position of cable straps using the release tab.



5. Adjust the position so that when a power plug is connected to system power the barb anchor can be inserted into the anchor hole above the power socket.



2U and 3U RAID models



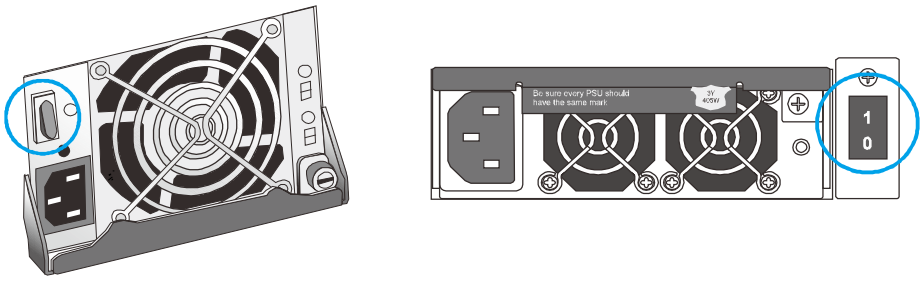
4U RAID models

Power On Procedure

Before you power on the RAID system, please power on the expansion JBOD storage systems first if your network configuration has multiple arrays.

To power on the system please follow the procedures below.

1. Turn on the power switches to the “on” position for every PSUs’ power switches, from left to right.



NOTE

Make sure all power supply modules’ switches are turned on!

2. Power on the networking devices, e.g. switches.

3. Power on the host computers. The host computers should be the last devices that are turned on. Please refer to the documentation that came with your host computers to see their power on procedures.

Power On Status Check

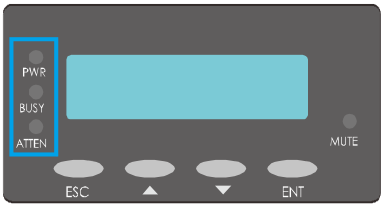
As a general rule, once the system has been powered on, there should **NOT** be LED(s) that light up **red** / **amber** nor should you hear an audible alarm from the system. You should begin verifying system statuses via the following monitoring interfaces:

- LEDs on LCD keypad panel**:** The LED on the LCD keypad panel should illuminate after a successful initialization process, indicating that system status is ready. System initialization and the power-on self-test may take up to five minutes and the system fault LED may light up during the process. The system fault LED will turn off after a successful boot-up process (refer to Front Panel Components).

- LEDs on rear chassis, including controller module, PSUs, and cooling modules (refer to System Monitoring).

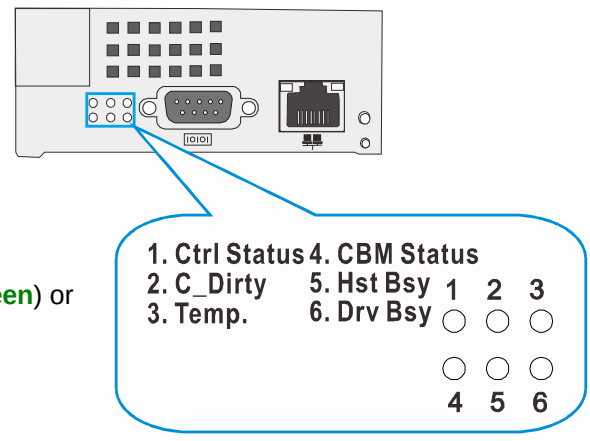
LCD Panel LEDs:

- PWR LED: OFF
- ATTN LED: OFF



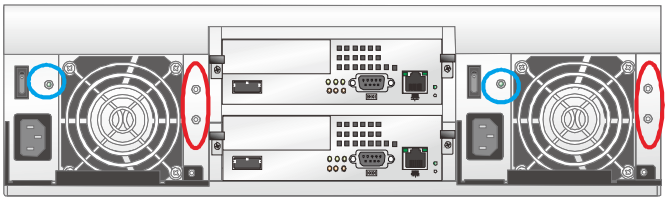
Controller LEDs:

- Status LED: On (**green**)
- C_Dirty LED: Off
- Temp LED: Off
- CBM Status LED: On (**green**) or Off

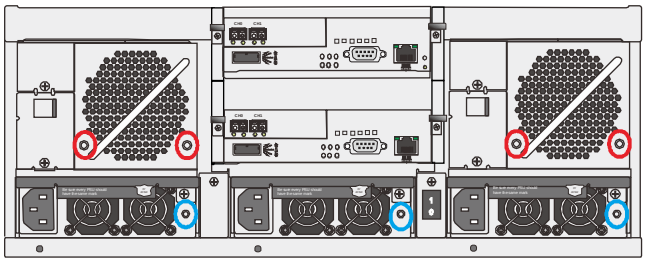


PSU LEDs:

- PSU LED **(indicated by the blue circle)** : **On** (**steady green**)
- Cooling fan LED **(indicated by the red circle)**: **Off**



2U & 3U



4U

LCD Screen

When powering on the RAID system, wait for the front panel LCD screen to show "**READY**" or "**No Host LUN.**"

The LCD screen startup sequence is shown and described in the sequence below:

Initializing… **Please Wait...**	This screen appears when the PSUs are turned on.
Power On Self Test Please Wait…	System is performing a self test.
Power on **Init Completed..**	System power-on self test is completed.
ES80xx	System is accessing various interfaces.
ES80xx **xGB RAM, Wait...**	Verifying installed memory.
ES80xx	System is ready. You can now start to configure the system.
ES80xx x **Ready**	System is ready for I/Os.

Power Off Procedure

If you wish to power down the system, please follow these steps:

> NOTE
>
> If you wish to power down the system, please ensure that no time-consuming processes, like “Regenerate Logical Drive Parity” or a “Media Scan,” are taking place.

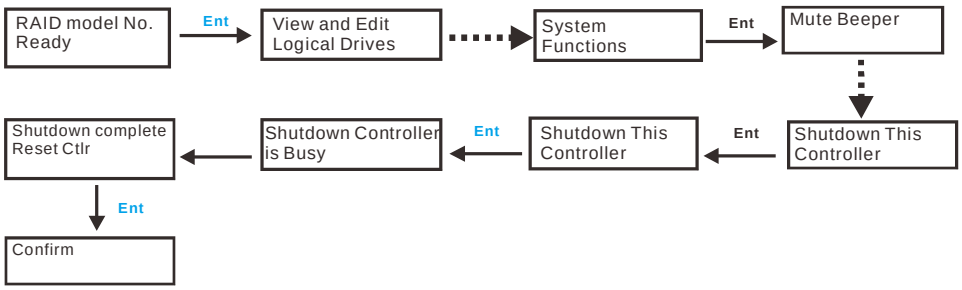
1. **Stop I/O access to the system**

   Close your applications running on the host computers to stop all I/O access to the system.

2. **Flush the cache**

   Locate the C_Dirty LED (refer to Controller LED for RAID Models) on the controller module to check if there is still cached data in the DRAM (if the LED is lid up in **amber**).

3. **Use the Shutdown Controller function to flush all cached data** (using the LCD panel, refer to the illustration below). This prepares the RAID system to be safely powered down.



Legend

Ent: Press the Enter (Ent) button.

Ent: Press and hold the Enter (Ent) button for 2 seconds.

---->: Press the up and down arrow to scroll to the menu you are after.

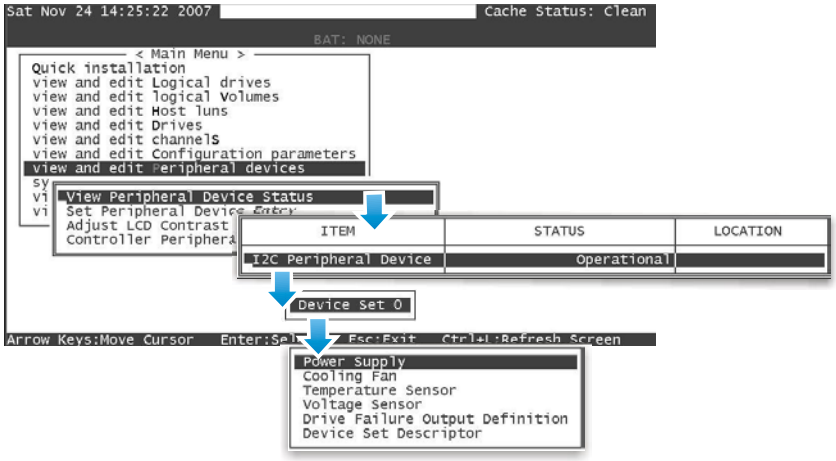
System Monitoring

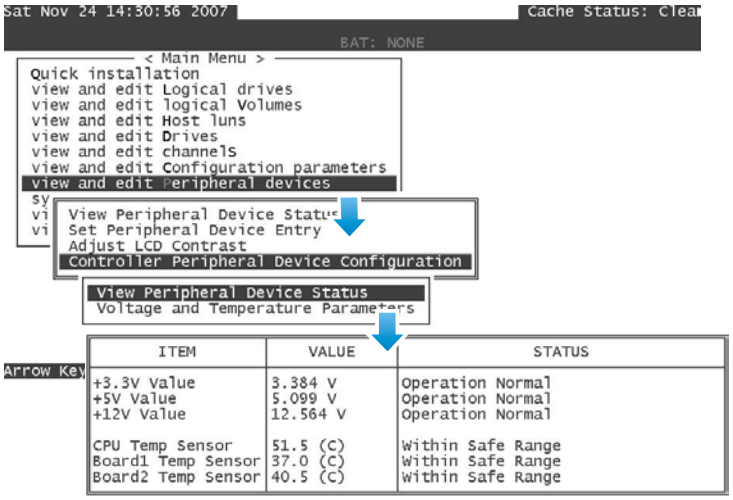
The EonStorDS series is equipped with a variety of self-monitoring features that help keep system managers aware of system operation statuses.

Monitoring Features

You may monitor the system through the following features:

- **Firmware**: The RAID controller in the system is managed by a pre-installed firmware, which is accessible in a terminal program via the serial port. For more details, see the Firmware manual in the CD-ROM.





- **SANWatch:** SANWatch is a Java-based Graphical User Interface (GUI) that can to monitor and manage the system locally or remotely over

TCP/IP network, via the Ethernet Management port. The management session is conducted using the Ethernet management port. For more details, see the SANWatch manual in the CD-ROM.

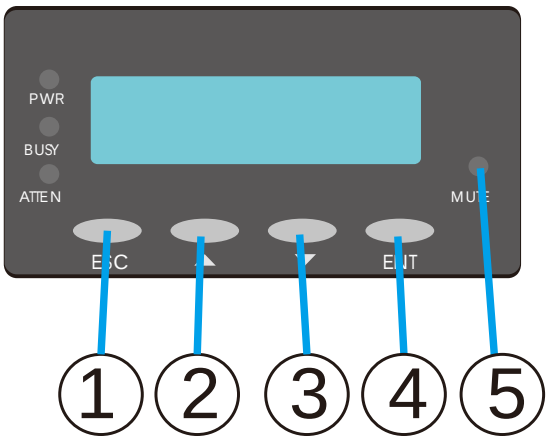
- **LEDs**: LED indicators notify users of system status, events, and failures. LEDs are located on both the front and rear panel of the chassis. For details, see and subsequent sections.
- **Audible alarm:** Audible alarm will be triggered in case of system failures. For details, see PSU / Cooling Module LEDs.

Front Panel

LCD Keypad for RAID Models

Keypad Buttons

The LCD keypad on RAID systems consists of five buttons, three LEDs, and a 16x2-character LCD screen that provides access to firmware-embedded utilities.



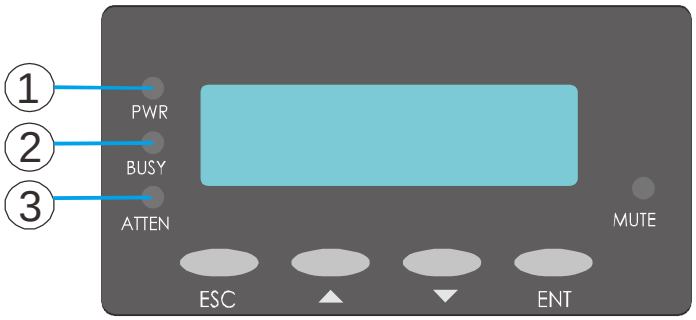
ESC button (1): Press the **ESC** button to skip the current event.

UP (2) & **DOWN button (3)**: Used for navigating menus by pressing the **UP** and **DOWN** arrow keys to select viewing items. In the bottom row of the main menu, “View and Edit Event Logs,” the most recent event is displayed.

ENT button (4): Used for browsing events: To see detailed description of each event, use the arrow keys to select an event, and press and hold down the **ENT** key until a short beep sound is heard, then use arrow keys to browse through the description lines. If you tab the **ENT** key lightly, you may choose to delete the event. Press **ESC** to return to the previous menu level.

Mute button (5): Used for muting the system: The **MUTE** button silences the alarm until the next event occurs.

LCD Panel LED Definitions

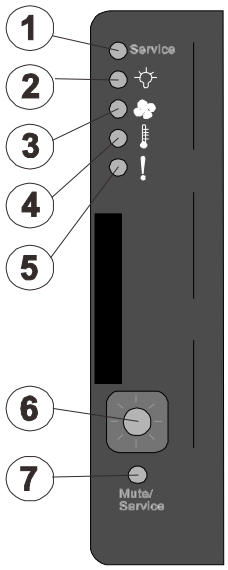


Name	Color	Status
1. PWR (Power)	**Blue**	**Blue** indicates that power has been turned on and the system status is normal. **OFF** indicates that no power is supplied to the system or the RAID system has failed.
2. BUSY	**White**	**Flashing white** indicates that there is active traffic on the host/drive channels. **OFF** indicates that there is no activity on the host/drive channels.
3. ATTEN (Attention)	**Red**	**Red** indicates that a component failure/ status event has occurred. **OFF** indicates that the system and all its components are in proper operation status.

NOTE

During the power-on process, the ATTEN LED will light up steadily. Once the system successfully boots up with no faults, the ATTEN LED will turn off.

LED Panel for JBOD Models

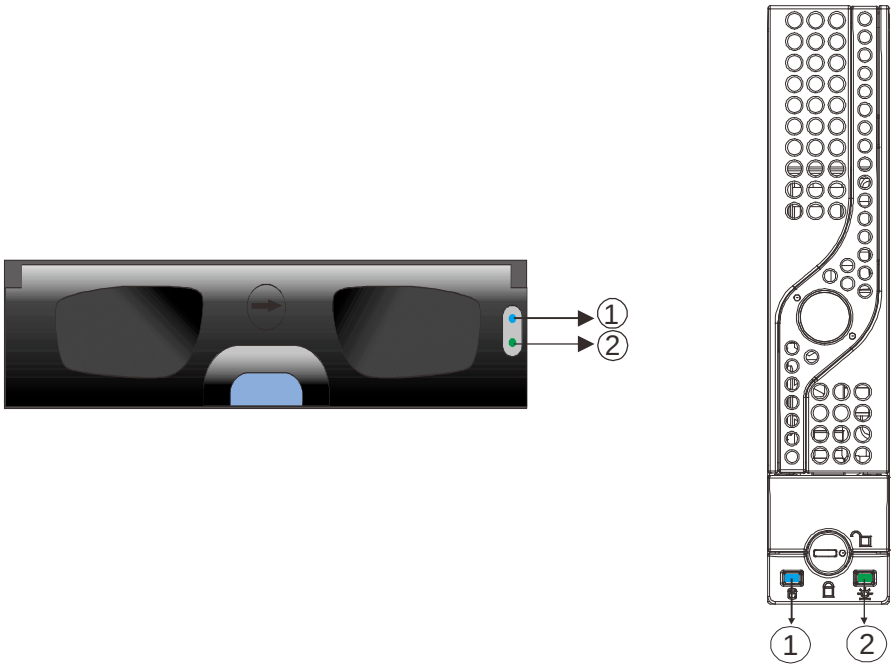


Name	Color	Status
1. Service	White	White indicates that the system is being serviced or is requiring services. **OFF** indicates that the system is not being serviced nor is requiring services.
2. Power	Green/ Amber	Green indicates that the system is powered properly. Amber indicates that there is a power failure in the system.
3. Cooling fan	Green/ Amber	Green indicates that the cooling fan is operating properly. Amber indicates that the there is a cooling fan failure in the system.
4. Thermal	Green/ Amber	Green indicates that the internal temperature is within the safety threshold. Amber indicates that the internal temperature has gone over the safety threshold.

5. System fault	**Green/ Amber**	**Green** indicates that the system is operating normally. **Amber** indicates that the system has encountered abnormal conditions:
6. Rotary ID switch	**N/A**	Allow users to set enclosure IDs when connected to JBOD expansion enclosure(s).
7. Mute/ service button	**N/A**	**Pressing less than one second** mutes the audible alarm. **Pressing more than two seconds** sends a service notification to the host computer.

Drive Tray LED

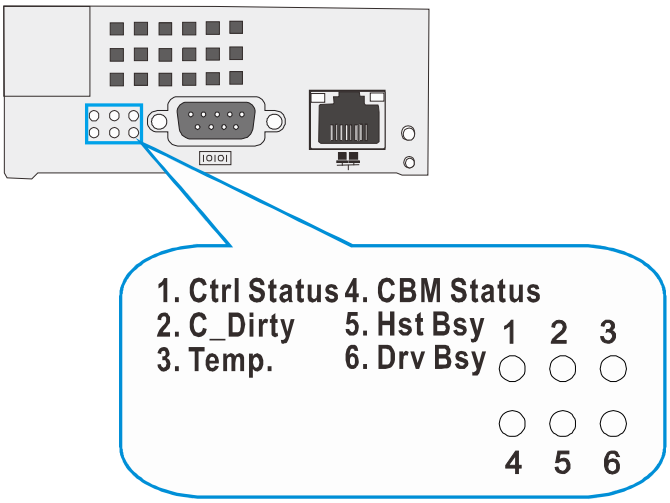
Two LED indicators are located on the right side of each drive tray. When notified by a drive failure message, you should check the drive tray indicators to find the correct location of the failed drive.



Name	Color	Status
1. Drive Busy	**Blue**	**Flashing Blue** indicates data is being written to or read from the drive. The drive is busy. **OFF** indicates that there is no activity on the disk drive.
2. Power Status	**Green** / **Red**	**Green** indicates that the drive bay is populated and is working normally. **RED** indicates that the disk drive has failed, or a connection problem occurred.

Controller LED

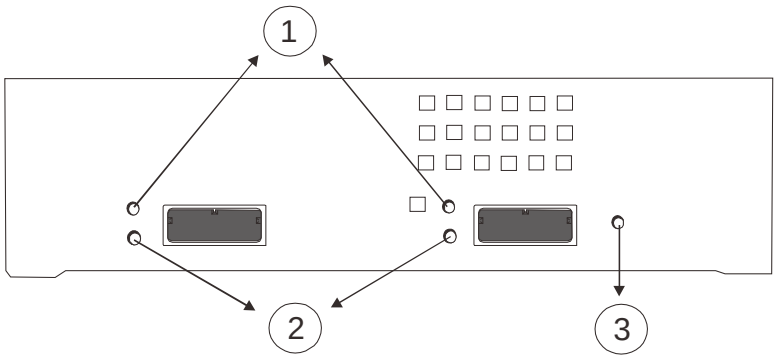
Controller LED for RAID Models



Name	Color	Status
1. Ctrl Status	**Green**/ **Amber**	**Green** indicates that a RAID controller is operating healthily. **Amber** indicates that a component failure has occurred, or inappropriate RAID configurations have caused system faults. It is also lit during the initialization process.
2. C_Dirty	**Amber**	**Amber** indicates the following: - Cache Memory is dirty. - Data in flash backup module is being flushed to cache. - Errors occurred with cache memory (ECC errors). - Data is being flushed from flash backup module to drive (when power is restored). - Battery voltage is lower than 2.5V. - Battery temperature reading is abnormal (out of the 0 to 45°C range). - Battery is not present. **OFF** indicates that the cache is clean, and that the

		battery backup unit is capable of sustaining memory in case of power loss. **Blinking Amber** indicates cached data is being transferred to the flash module after the occurrence of a power outage. Once the transfer is done, all LEDs will turn off. This signal is local to each controller.
3. Temp.	**Amber**	**Amber** indicates that the detected CPU/board/chassis temperature has exceeded the higher temperature threshold. **OFF** indicates that the detected temperature reading is within the safe range.
4. CBM Status	**Green/ Amber**	**Green** steady on indicates the CBM module is ready. Both a BBU and flash modules are present. **Amber** steady on indicates CBM failure, meaning either BBU or flash has failed. When lit, it also indicates either BBU or a flash is missing in a redundant-controller system. **Blinking** means a BBU is being charged. **OFF** means BBU is not installed in a single-controller "G" model.
5. Hst Bsy	**Green**	**Blinking Green** to indicate traffic on the host bus.
6. Drv Bsy	**Green**	**Blinking Green** to indicate traffic on the drive channels.
7. Restore Default	**Green**	**Green** indicates the RAID configuration default has been successfully restored. The LED state will be invalidated after a few seconds.

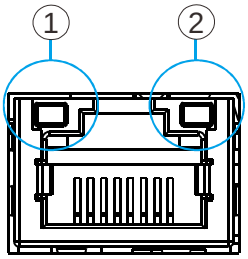
Controller LED for JBOD Models



Name	Color	Status
1. SAS Link	**Green**	**Steady green** indicates all 4 PHYs are validly linked to external devices. **Blinking green** indicates one of the 4 PHYs links has failed. **OFF** indicates all 4 PHYs are offline.
2. SAS Speed	**Green / Amber**	**Green** indicates 6Gbps link speed. **Amber** indicates 3Gbps link speed. **OFF** indicates no connection.
3. Ctrl Status	**Green** / **Amber**	**Green** indicates the controller is operating normally. **Amber** indicates a component failure has occurred. It is also lit during the initialization process.

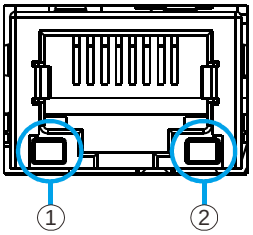
Ethernet Management Port LEDs

Type I



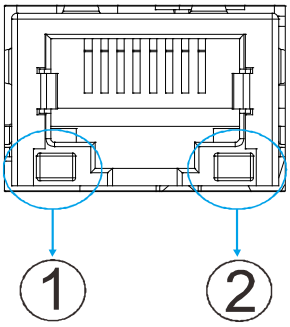
Name	Color	Status
1. Speed status LED	**Green**	**Green** indicates 100Mbps connection established.
	Off	**Off** indicates 10 Mbps connection established or no connection established.
2. Link / activity LED	**Green**	**Steady green** indicates connection established
		Flashing green indicates data activity.
	Off	**Off** indicates connection not established.

Type II



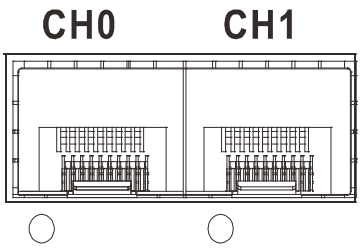
Name	Status	Status
1. Speed status LED	**Green**	**Green** indicates 1Gb connection established.
	Off	**Off** indicates 10/100Mb connection established or no connection established.
2. Link / activity	**Amber**	**Steady amber** indicates a connection has been established. **Flashing amber** indicates data I/O.
		Off indicates connection not established.

iSCSI Host Port LEDs



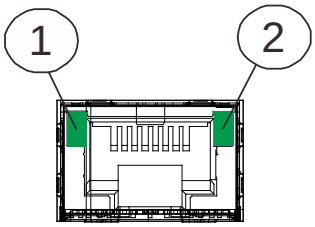
Name	Color	Status
1. Speed status LED	**Green**	**Green** indicates 1Gb connection.
	Off	**Off** indicates 10/100 Mb connection established or is not connected.
2. Link / activity status LED	**Amber**	**Amber** indicates connection established.
	Flashing	**Flashing** indicates data I/O activity.

10Gb iSCSI Host Port LEDs (Fibre)



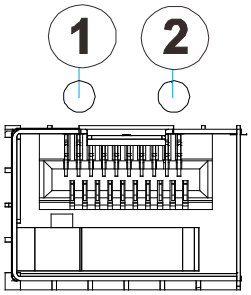
LED status	Color	Status
Steady ON	**Green**	**Steady green** indicates a link has been established.
Flashing	**Green**	**Flashing green** indicates an active link.
Off	**Off**	**Off** indicates a link has not been established.

10Gb iSCSI Host Port LEDs (RJ45)



No.	Item	Status
1.	**Speed LED**	**Green** indicates 10Gb connection established **Amber** indicates 1Gb connection established **Off** indicates 10/100 connection established
2.	**Link Status LED**	**Green** indicates connection established **Flashing green** indicates data activity **Off** indicates connection not established

8Gb Fibre-Host Port LEDs

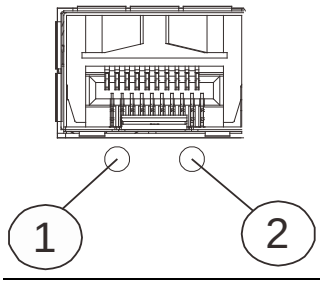


Each controller module houses fibre channel host ports. Each of these ports has two LEDs for displaying the operating status.

Name	Color	Status
1. Link	**Green**	**Green** indicates an established link, Off means a link is broken.
2. 8/4/2G	**Green / Amber / Off**	**Green** indicates 8Gbps connection.
		Amber indicates 4Gbps connection.
		OFF indicates 2Gbps speed or no connection.

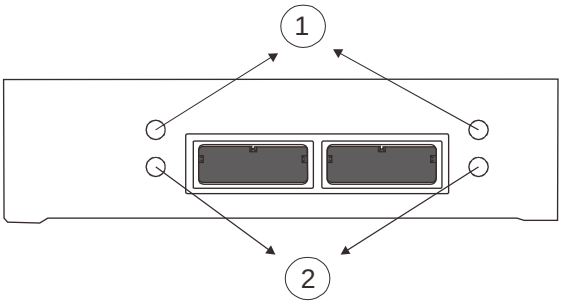
For systems that come with 8Gb Fibre channel host ports. They deliver fast I/O performance for Storage Area Network (SAN) applications. Optical cables can be used over distances and have been shown to be more reliable. Due to the demands of high transfer rates, optical cables are preferred for 8/4Gbps fiber connectivity. Optical cables are also less susceptible to EMI.

16Gb Fibre Channel Host Port LEDs



No.	Item	Status
1.	**Link Status LED**	**Green** indicates connection established **Flashing green** indicates data activity **Off** indicates connection not established
2.	**Speed LED**	**Green** indicates 16Gb connection established **Yellow** indicates 8Gb connection established **Off** indicates 4Gb or slower connection established

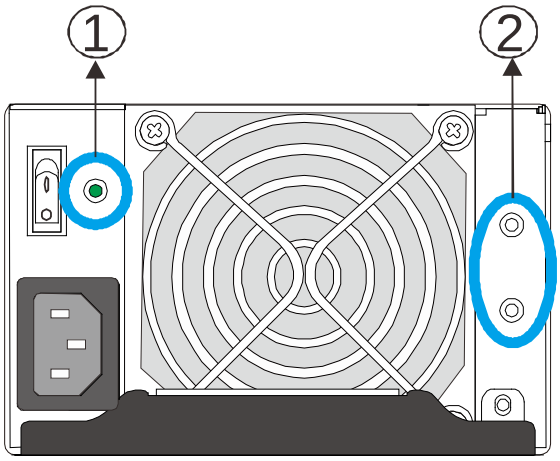
SAS-Host Port LEDs



Name	Color	Status
1. SAS Link Status	**Green**	**Steady Green** indicates that all 4 PHYs are validly linked to external devices.
		Blinking indicates less than 4 PHY links are connected.
		OFF indicates all 4 PHYs are offline.
2. SAS Speed Status	**Green / Amber**	**Green** indicates a 6Gbps link.
		Amber indicates a 3Gbps link.
		OFF indicates that there is no connection.

PSU / Cooling Module LEDs

The PSU (Power Supply Unit) contains the LEDs for the PSU and the cooling module statuses. When either of the unit fails, you need to replace the PSU as soon as possible. For details, please refer to Replacing the Power Supply Module.



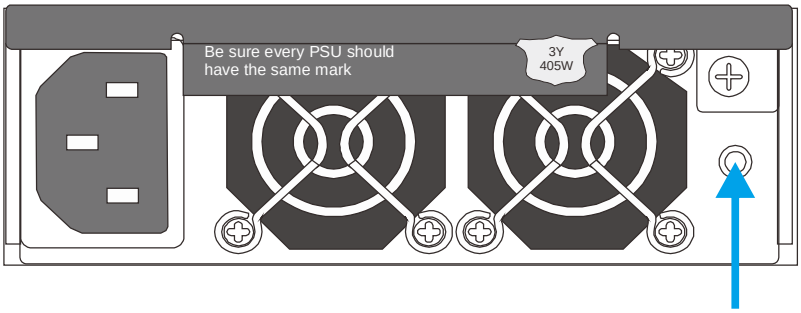
1. PSU Status LED

Status	Description
Flashing (Green)	The system is connected to power supply but the power switch has not turned on.
On (Green)	The PSU is operating normally.
On (Red)	The PSU has failed and is unable to provide power to the system.

2. Cooling Fan Status LEDs

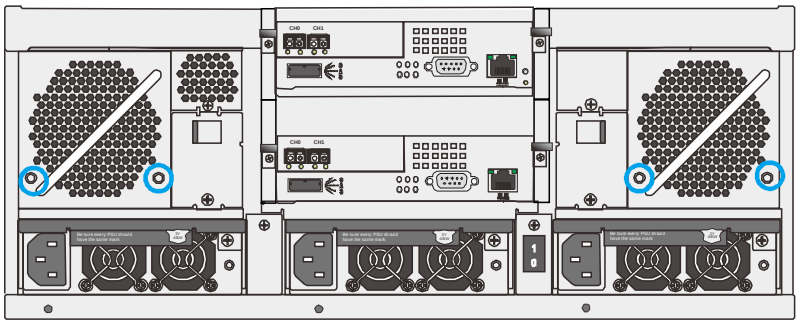
Status	Description
OFF	The cooling fan is operating normally.
ON (RED)	The cooling fan has failed.

4U RAID Power Supply LED



Status	Description
Blinking Green	The power supply has not been turned on. The PSU module LED will (indicated by the **blue arrow**) blink when the system is connected to a power source but not yet turned on.
Steady Green	The PSU is operating normally and experiencing no problem.
Steady Red	The PSU has failed and is unable to provide power to the system.
OFF	The PSU is not turned on and the power cord is disconnected.

4U RAID System Cooling Module LED



Status	Description
OFF	The cooling fan is operating normally.
RED	The cooling fan has failed.

Alarms and I2C Bus

Other monitoring schemes include audible alarms and I^2C bus.

Audible Alarms

If any of the following components fails, the audible alarm will be triggered:

- Cooling fan modules
- PSU modules
- CBM module
- Hard disk drives
- Sensors or presence detection circuitries

If the system administrator hears an alarm, the manager must read the error message on the terminal or SANWatch screen to determine what has triggered the alarm, and then take appropriate actions to rectify the problem. The alarm can be turned off using the mute button on the front panel and the Alarm beep pattern is described in the Troubleshooting Guide included in the CD-ROM.

NOTE

When temperature exceeds a preset threshold, the controller's charger circuits will stop charging. You will then receive a message that reads "Thermal Shutdown/Enter Sleep Mode." When the temperature falls back within normal range, the battery will resume charging.

I^2C

The operating status of PSU and cooling fan modules are collected through an I^2C serial bus. If either of those modules fails, the failure will be detected and you will be notified through the same methods as in the audible alarms.

Restoring Default System Settings

> NOTE
>
> Restoring default settings is a last-resort function. All configurations, such as parameters and host LUN mappings, will be erased.

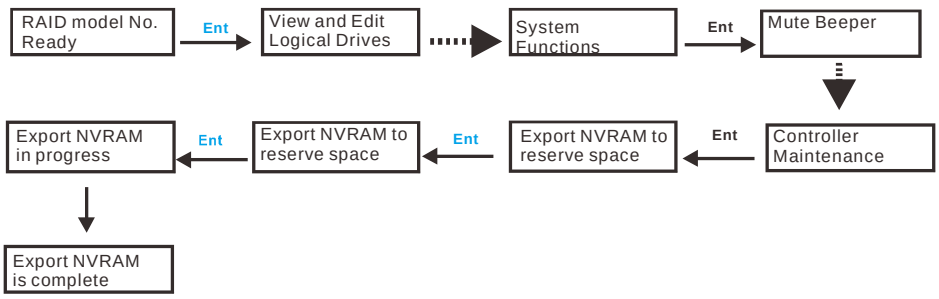
You may need to restore default settings in the following cases:

- When the firmware update procedure requires it.
- When you need to reset the password to access the RAID system.

Restoring Default Settings

To restore default settings for dual-controller models, follow these steps.

1. Stop all host I/Os.
2. Save the current configuration using the "**Export NVRAM**" function on the LCD panel.



Legend

Ent: Press the Enter (Ent) button.

Ent: Press and hold the Enter (Ent) button for 2 seconds.

---->: Press the up and down arrow to scroll to the menu you are after.

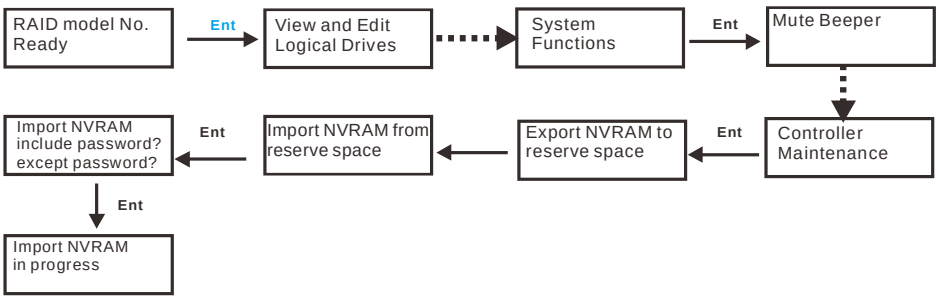
3. You may also want to make a list of the existing ID/LUN mapping information because the default restoration will erase the ID/LUN mapping associations (e.g., which logical drive is associated with which host ID/LUN)
4. Remove Controller B from the chassis. Please refer to Removing the RAID Controller.

5. Power off the RAID system.

6. Press and hold the Restore Default button (indicated by the **blue arrow**) on Controller A. You may use a straightened paper clip to press the button. While pressing the Restore Default button down, power on the RAID system.

7. When the "**Restore Def.**" LED (indicated by the **black arrow**) lights up and the "**Default Restored**" firmware event message appear, you may release the Restore Default button (the system default has been restored).

8. Restore previous settings using the "**Import NVRAM from reserve space**" or "**Restore NVRAM from Files**" in the firmware. ID/LUN mapping will be restored.



Legend

Ent: Press the Enter (Ent) button.

Ent: Press and hold the Enter (Ent) button for 2 seconds.

---->: Press the up and down arrow to scroll to the menu you are after.

*The Single controller system's restore default procedure is complete and for **Dual Controller** systems, please continue with the following procedures.

9. Power off the system.
10. Replace Controller A with Controller B (Controller B will be inserted into Controller A's slot) While leaving Controller B slot empty with Controller B in slot A, perform the above steps 1 to 8 to restore Controller B to default settings.
11. Put both Controller A and Controller B into their original positions and power up the system.

System Maintenance

WARNING

Do not remove a failed component from the system until you have a replacement on hand. If you remove a failed component without immediate replacement, it will disrupt the internal airflow.

Qualified engineers who are familiar with the system should be the only ones who make component replacements.

When inserting a removable module, do not use excessive force. Forcing or slamming a module can damage the connector pins either on the module itself or on the backplane.

The following components can be replaced:

- Controller module (please refer to Replacing the Controller Module)
- Memory module (please refer to Replacing the Memory Module for RAID Models)
- CBM module (please refer to Replacing the CBM for RAID Models)
- PSU module (please refer to Replacing the Power Supply Module)
- Hard drive (please refer to Replacing the Hard Disk Drive)

Replacing the Controller Module(s): Single / Dual / Simultaneous Upgrade

WARNING

Controller firmware **MUST** be identical for proper functionality.

DO NOT mix controller modules from different models. Each controller has a unique ID which is applied to host port names. As the result, you may encounter SAN problems with identical port names on multiple systems.

When removing a RAID controller from a single-controller system, ensure that your applications have been shut down beforehand.

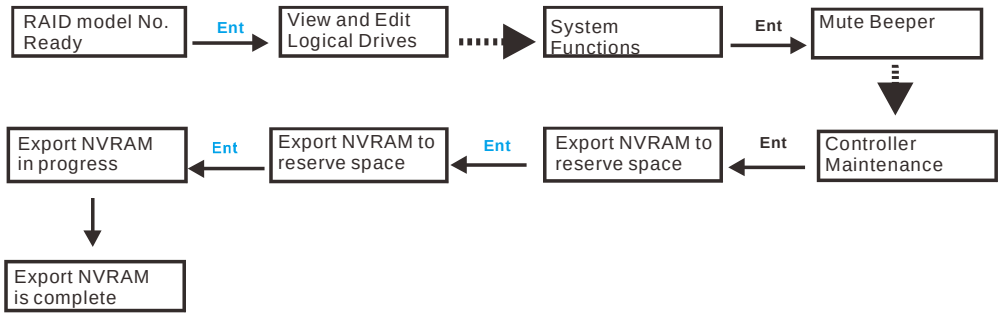
Controller firmwares **MUST** match so before you replace a controller in a dual controller system, please check if the firmware of the operational controller matches the replacement controller sent to you. The replacement controller sent to you will state its firmware version with a label on the packaging. To find out the firmware version of your operating controller, use Storage Manager > Information > Enclosure View in SANWatch (please refer to the SANWatch Manual for details).

To update the firmware, please refer to the following:

a. EonStorDS SANWatch User Manual on Upgrading the Firmware

b. Firmware Manual on System Functions: Upgrading Firmware

Before you replace the controller(s), export and save the NVRAM data using the LCD panel, follow the illustration below:



Legend

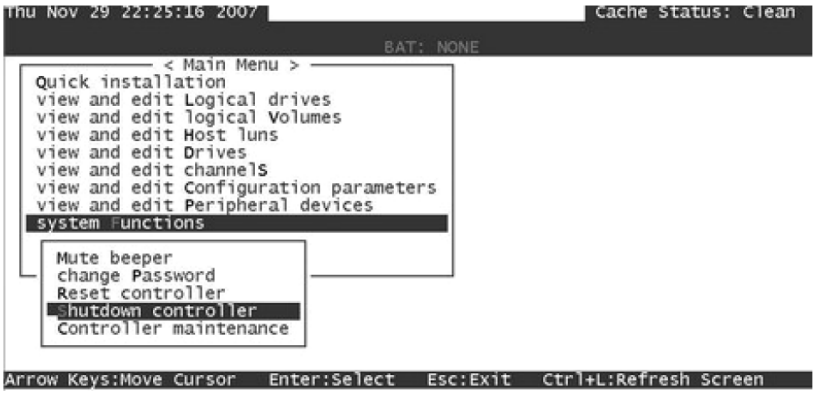
Ent: Press the Enter (Ent) button.

Ent: Press and hold the Enter (Ent) button for 2 seconds.

---->: Press the up and down arrow to scroll to the menu you are after.

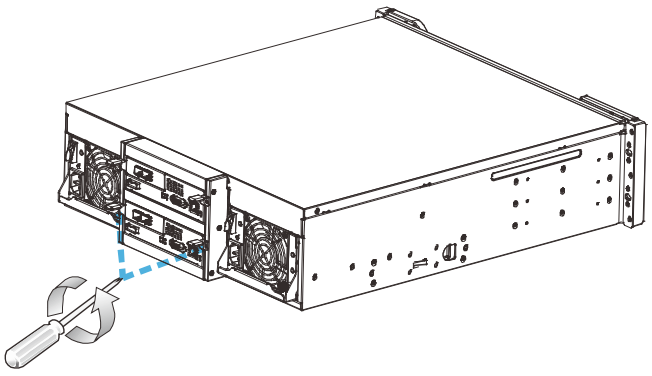
1. Prepare a clean, static-free work pad or container to place the controller.

2. **(Replacing single controller models or both controllers simultaneously) Shut the system down.** Stop all I/O access to the system and make sure all cached writes have been distributed to disk drives using firmware's Main Menu -> System Functions > Shutdown controller function. Power off the system and turn off the power switches and unplug the power cords from PSUs

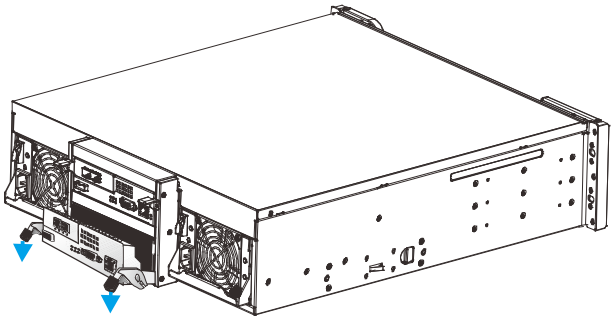


3. **Disconnect all cables** that are connected to the controller module.

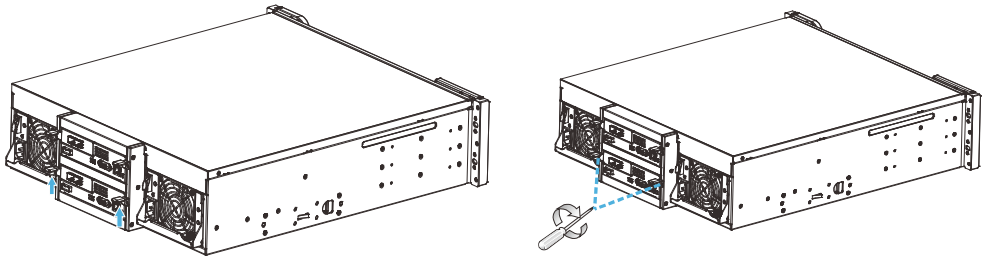
4. **Loosen the screw** that secures the control module's ejection levers.



5. **Push the ejection levers downwards (indicated by the blue arrows).** The controller module will automatically ease out of the controller module bay.



6. **Insert the new controller module**. Carefully push the controller until you feel the contact resistance when the board edge connectors are engaging the backplane. Push the ejection levers upward (indicated by the **blue arrows**) and fasten the retention screw on the ejection levers.



7. Reattach all the cables.

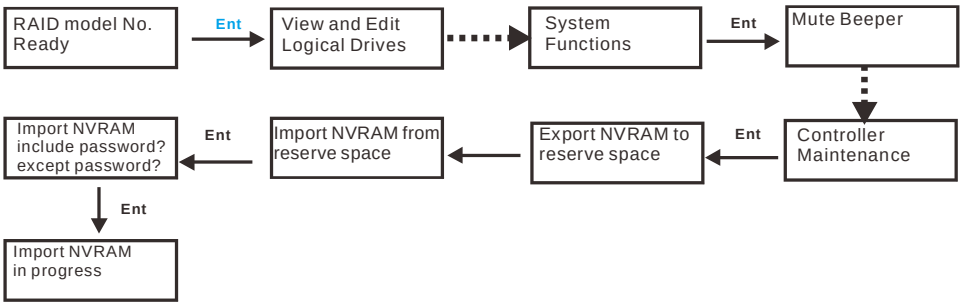
8. **For single controller models or when replacing both controllers simultaneously, power up the system**. Check system message on the LCD screen, SANWatch, or firmware menu-driven utility. When the replacement controller is successfully brought online, the Power On Status LEDs should turn on properly.

9. **For single controller models or replacing both controllers simultaneously**, **Restoring NVRAM data.** To restore previous ID/LUN mapping settings, users may use the following options:

   - Use the "**Restore NVRAM from Disks** "or "**Restore NVRAM from Files**" functions in the firmware. ID/LUN mapping will be restored.

Or

- Use the LCD panel to restore ID/LUN mapping settings (refer to the illustration below).



Legend

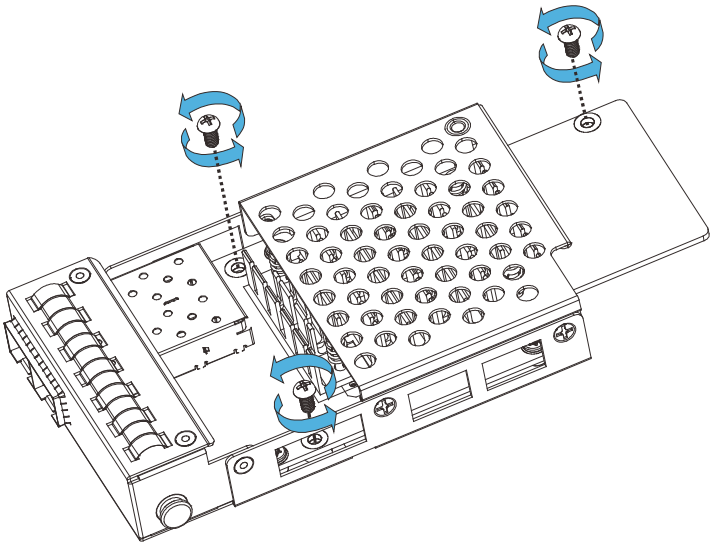
Ent: Press the Enter (Ent) button.

Ent: Press and hold the Enter (Ent) button for 2 seconds.

---->: Press the up and down arrow to scroll to the menu you are after.

Replacing the Controller Host Board

1. Power off (if you have a single controller system and it is in operation) the system and remove the controller from the enclosure.
2. Remove the existing host board from the controller by loosening the three screws.



3. By holding onto the edges of the PCB, carefully remove the host board from its antistatic package.
4. Install the new host board into the exact same position and secure it with three screws.

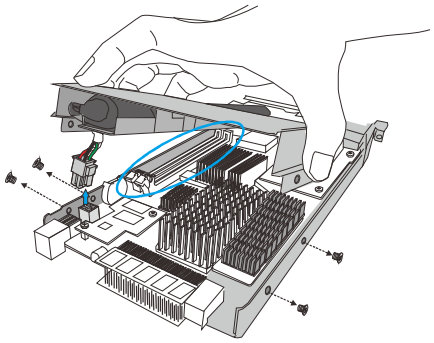
Replacing the Memory Module on RAID Systems

The RAID controller comes with pre-installed DRAM module(s). You may upgrade it or replace it when the original module malfunctions (shown as the “NVRAM failure” event in SANWatch).

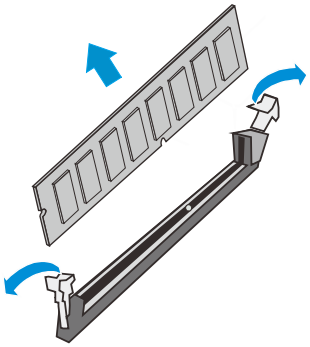
> WARNING
>
> Follow the ESD Precautions (refer to ESD Precautions).
> Contact your system vendor for selecting a compatible DRAM module.
> Reusing the DRAM module removed from a failed controller is not recommended unless you have a similar RAID system to test its integrity.

Installing the DIMM Module

1. Remove the controller module (refer to Replacing the Controller Module).
2. **(If applicable)** Remove the BBU module (refer to Replacing the BBU).
3. **Wait for one minute** for the remaining electricity on the main board to disperse.
4. Push down the clips on the sides of the DIMM socket (indicated by the **blue circle**). The DIMM will eject automatically from the socket.

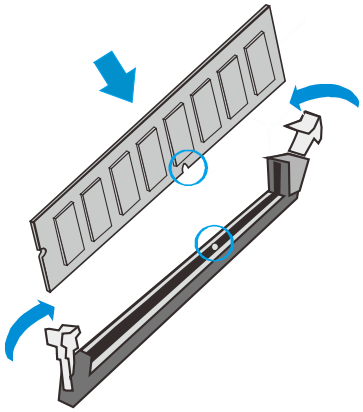


Removing the BBU



Removing the module

5. **Insert the replacement module**. Make sure the side clips are in the open positions. Align the DIMM module with the socket and firmly push the DIMM module into the socket. The side clips will close automatically and secure the DIMM module into the socket.



6. **(If applicable)** Reinstall the BBU module (refer to Replacing the BBU).

7. Reinstall the controller module into the chassis (refer to Replacing the Controller Module).

Replacing the CBM for RAID Models

NOTE

Flash backup module (FBM) is not user serviceable!

Upgradeable / replaceable components are listed below:

- **Battery Backup Unit (BBU)**: In the event of a power failure, the BBU can help store/ save cached data in the DRAM module for up to 72 hours.
- **Battery Backup Unit (BBU) + Flash Backup Module (FBM)**: In the event of a power failure, the combination of BBU+FBM (non-volatile flash storage) can store the data, indefinitely.

WARNING

Make sure you have the replacement module(s) on-hand before you attempt to replace the CBM.

Please refer to procedures mentioned in Installing the BBU section.

The CBM consists of a battery backup unit (BBU) and flash backup module (FBM). The CBM can sustain and transfer cached data to a flash backup module in the event of a power outage or in the unlikely event of both PSUs failing.

The CBM (BBU and FBM) are optional items for single controller system by default.

BBU Fault Conditions and Precautions

If a BBU leaks, gives off a bad odor, generates heat, becomes discolored or deformed, or in any way appears abnormal during use, recharging or storage, immediately remove it from the system and stop using it. Here are some of the conditions that might trigger BBU fault.

- The temperature sensor on the system's charger circuit reports a temperature reading exceeding the pre-set threshold. The charger circuits will enter a low-power and self-protection state.
- A BBU module has been charged for over twelve hours. A timer is embedded with the charger. When this occurs, the charger will enter a timer fault state. Charging will resume automatically after you remove/re-install the BBU module or reset the system.

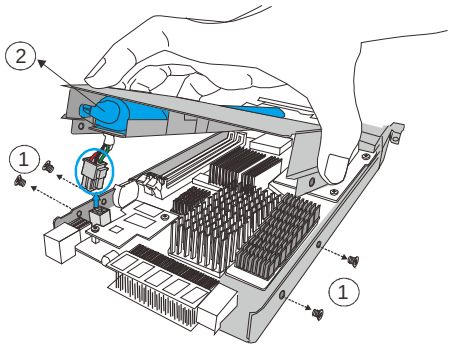
Follow these precautions when you install the BBU.

- Use the replacement BBU supplied by your distributor. Use of battery cells provided otherwise will void your warranty.
- Dispose of used BBUs at authorized battery disposal sites only.
- Do not place a BBU near a heat source.
- Do not immerse the BBU in water or expose it to liquids.
- Do not disassemble or modify the BBU.
- Do not pierce the BBU with a sharp object, strike it with a hammer, exert pressure on it, or throw it.

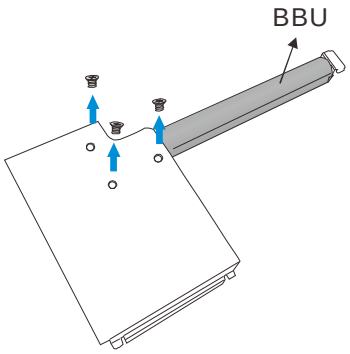
Replacing the BBU

To replace the BBU, follow these steps:

1. Remove the controller out of the enclosure (refer to Removing the Controller).
2. Loosen screws **(1)** and remove the BBU **(2).** For type II controller models, please unplug the BBU power connector (indicated by the **blue circle**).



3. For type II controller systems, to separate the BBU from the top cover, unscrew the screws shown in the following illustration.



4. Install the replacement module and fasten screws (refer to Installing the BBU).
5. Reinstall the controller (refer to Installing the RAID Controller).

NOTE

A replacement BBU takes approximately twelve hours to charge to its full capacity.

The life expectancy of a BBU is three years.

If the cause of a failure cannot be determined even after a BBU module is replaced, contact your system vendor.

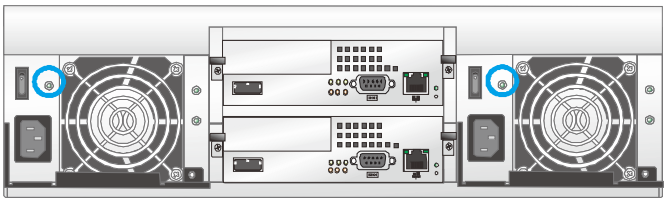
Replacing the Power Supply Module / Cooling Module

The power supply units (PSU) are configured in a redundant configuration with each PSU housed in a robust steel canister.

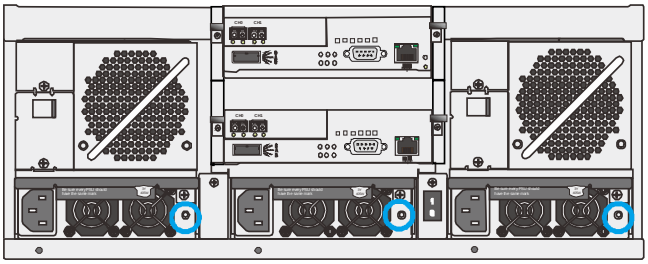
Detecting a Failed PSU

If a PSU module fails, the system notifies you through the following indicators:

- PSU status LED locations (**blue circles**)



2U / 3U systems



4U systems

- Audible alarm (refer to Audible Alarms)
- Firmware utility (refer to Firmware User Manual in the CD-ROM for details)
- SANWatch manager software (refer to SANWatch User Manual in the CD-ROM for details)

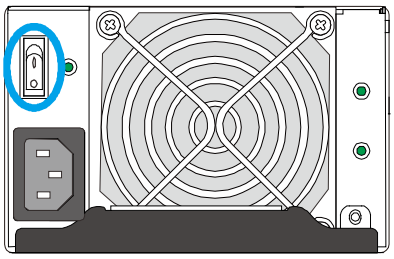
Replacing 2U / 3U Power Supply Unit

A failed PSU should be replaced as soon as possible, but only when you have a replacement module in your hand. Contact your vendor for more details (refer to Contact Information).

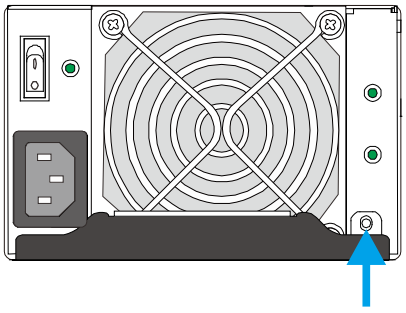
> WARNING
>
> Although the system can operate with a failed PSU in a system, it is not recommended to run the system with a failed PSU for an extended period of time. The failed spare redundant PSU should be replaced as soon as possible!

To replace a PSU, follow these steps:

1. Power off the system, turn off the PSU and unplug the power cord.

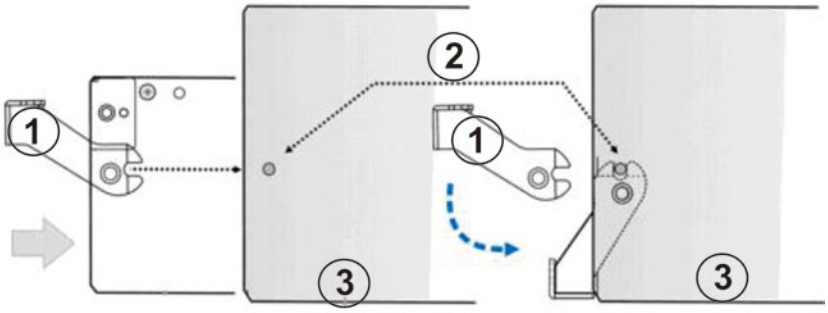


2. Loosen the retention screw that secures the extraction handle to the chassis.



3. To remove the PSU module, grab the extraction handle and pull the handle upwards to disconnect the PSU from the backplane connectors. Once dislodged, gently pull the PSU out of the system. If the system is mounted in a rackmount rack, use another hand to support its weight while removing the module.

4. Insert the replacement module. Make sure the extraction handle **(1)** is held at its highest position so that the saddle notches on the sides of the handle can snap onto the metal anchor pins **(2)** placed along the interior walls of the PSU slot. Push the PSU into chassis **(3)**, and when you feel the contact resistance, use slightly more force to engage the back-end connectors. Push the handle downwards to secure the module.

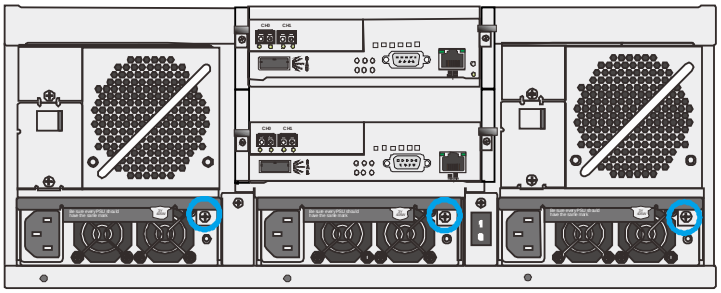


5. Fasten the retention screw.
6. Reconnect the power cord.
7. Power on the PSU module.

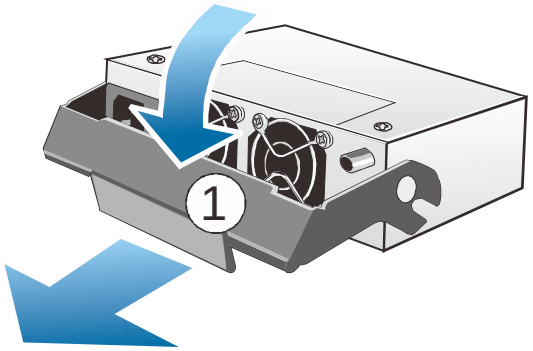
Replacing 4U RAID System PSU

1. **Disconnect the power cord** that connects to the failed PSU.

2. **Loosen the retention screw** (indicated by the **blue circles**) that secures the extraction handle to the chassis using a Phillips screwdriver.



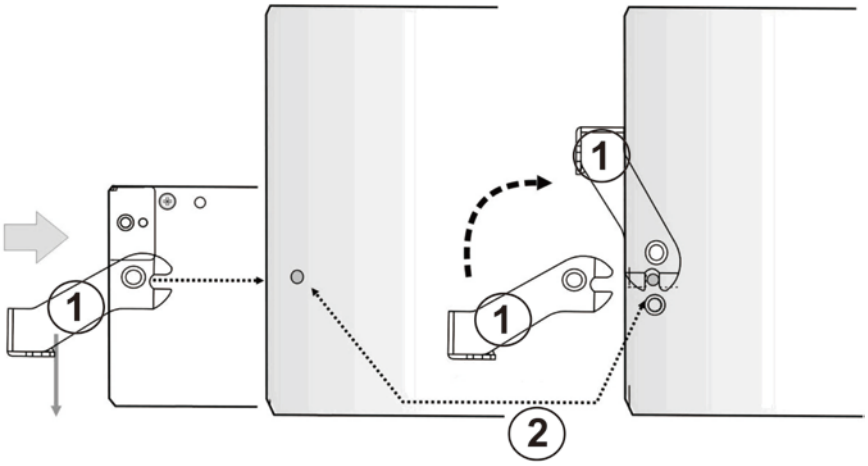
3. **Remove the PSU module** by pushing the extraction handle **(1)** downwards. The extraction handle should gracefully disconnect the PSU from the backplane connectors. Once dislodged, gently pull the PSU module out of the system. If the system is mounted in a rack-mount rack, use another hand to support its weight while removing the module.



WARNING!

It is recommended that the replacement procedure is completed in less than five (5) minutes to prevent prolonged disruption to system airflow.

4. **Install the replacement module**. Make sure the extraction handle **(1)** is held at its lowest position so that the saddle notches on the sides of the handle can snap onto the metal anchor pins **(2)** on the interior walls of the PSU slot. Push the PSU into chassis, and when you feel the contact resistance, pull the handle upwards to secure the module.



Secure the PSU to the system by fastening the retention screw through the PSU extraction handle.

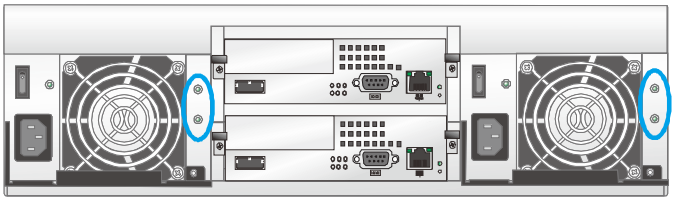
Replace the power cord that connects the PSU module to the mains.

Secure the power cord connection using the included cable clamp.

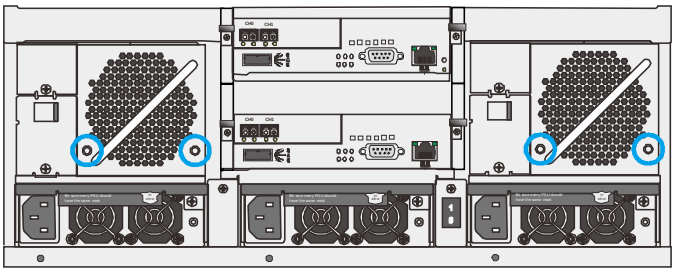
Replacing a Cooling Module

If a cooling module fails, the system notifies you through the following indicators:

- Cooling module status LED locations (**blue circles**)



2U / 3U systems



4U systems

- Audible alarm (refer to Audible Alarms)
- Firmware utility (refer to Firmware User Manual in the CD-ROM for details)
- SANWatch manager software (refer to SANWatch User Manual in the CD-ROM for details).

NOTE

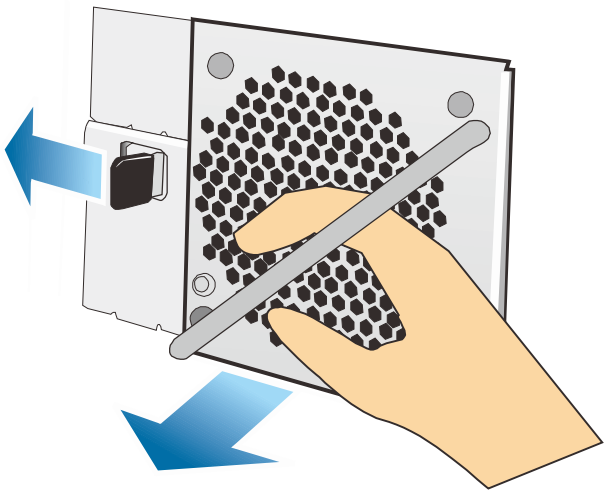
For 2U / 3U systems' cooling module, please refer to its PSU replacement procedure.

Replacing 4U RAID Systems Cooling Module

The cooling module is secured in the chassis by a retention latch. To replace the cooling module, follow the steps below:

> WARNING!
>
> The fan replacement process should be completed within five (5) minutes. If the process takes too long, the accumulated heat can damage the system.

1. Use one hand to push the retention latch to the side, while using another hand to hold and pull on the fan module extraction handle.



2. Once released from the module bay, remove the faulty module.

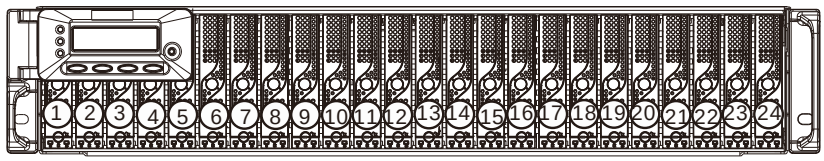
3. Install the replacement module by pushing it gently into the module bay. You may need to push the retention latch sideways (just as when you were removing it) while installing the replacement module. When fully inserted, the retention latch will hold the module in place.

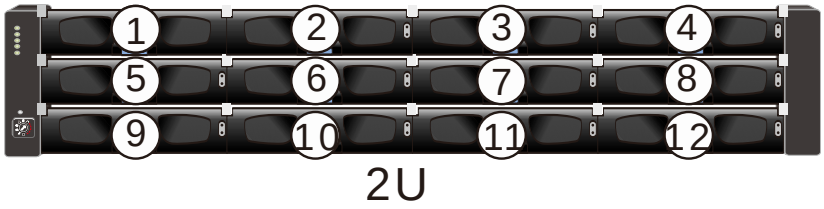
Replacing a Hard Drive

> WARNING
>
> Keep a replacement on hand before replacing the hard drive. Do not leave the drive tray open for an extended period of time or the internal airflow will be disrupted.
>
> Handle the hard drives with extreme care. Carry them only by the edges and avoid touching their circuits part and interface connectors.

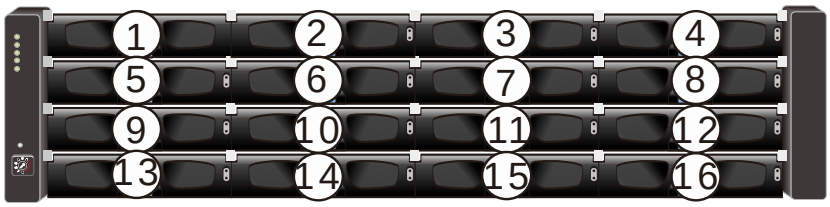
To replace a hard drive, follow these steps.

1. **Identify the drive tray**. Use the firmware utility, SANWatch, or the LED on the drive tray to identify faulty hard drive(s). The drive bays are numbered from left to right and from top to bottom.

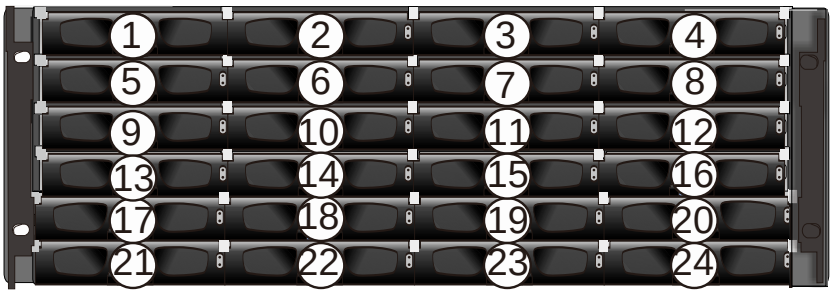




2U

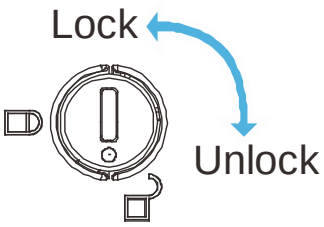


3U

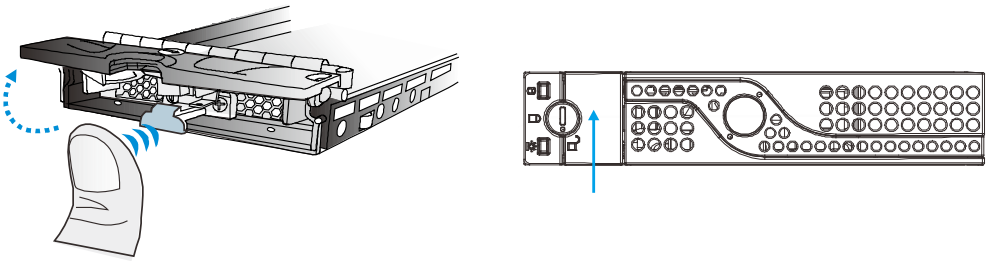


4U

2. **Unlock the drive tray bezel** (indicated by the **blue arrow**) by using a small flat-blade screwdriver to set the bezel lock from lock to the un-lock position.

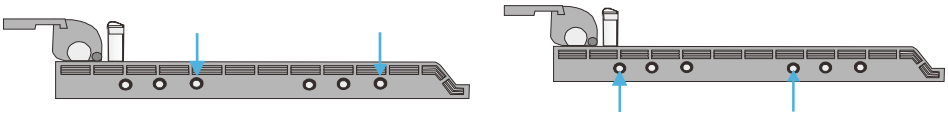


3. **Open the drive tray**. Press the button. The spring handle will pop out.

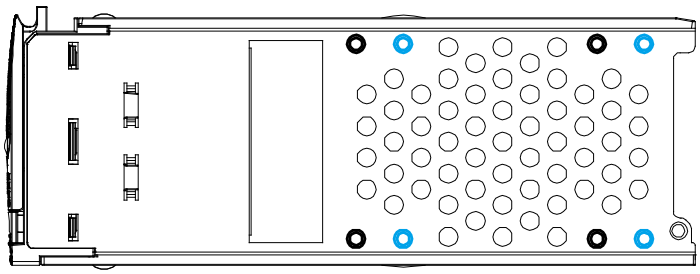


4. **Remove the drive tray**. Pull the tray one inch away from the enclosure. Wait for at least 30 seconds for the disk drive to spin down, and then gently withdraw the drive tray from the chassis.

5. **Remove four retention screws** (two on each side). The screws secure the hard drive to the drive tray.



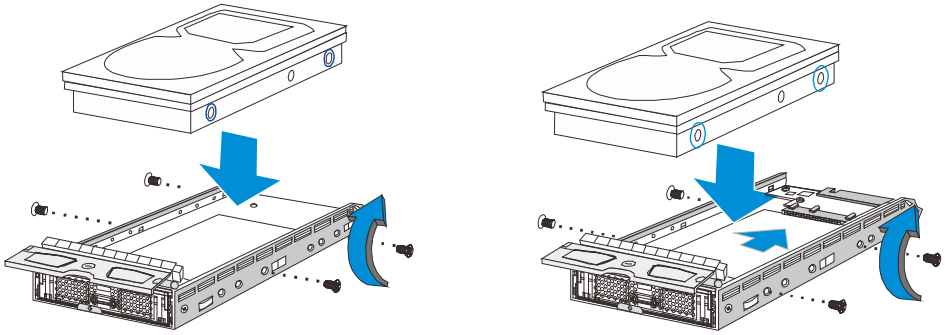
Without mux board **With mux board**



2.5 inch SAS hard drive

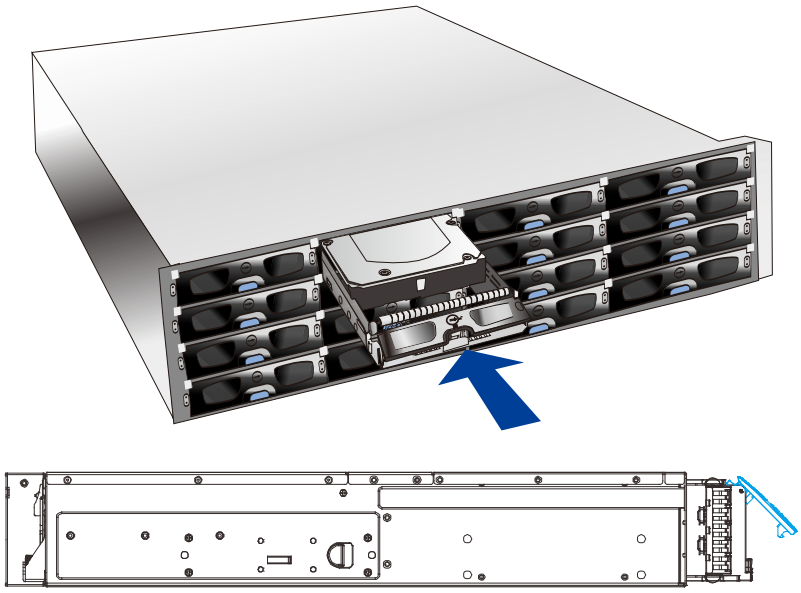
2.5 inch SATA hard drive

6. **Replace the drive.** After swapping the drive, fasten the retention screws back.



Without MUX **With MUX**

7. **Insert the drive tray back into the enclosure.** Install the drive tray with the front bezel open. When fully inserted, close the front bezel.



8. **Lock the drive tray.** Turn the bezel lock to the vertical orientation (locked position) using a flat blade screwdriver. Do not push the bezel lock while turning it, otherwise the spring handle will pop out again.

NOTE

Never leave the bezel lock unlocked – the RAID controller might consider it as a faulty drive.

9. **Check for drive error.** Make sure that there is no more error reported.

Appendix

Technical Specifications

Host/Drive Interface

Fibre-host RAID models	
Host O/S Compatibility	Host O/S independent
Host Interface	8Gbps / 16Gbps Fibre
Host Channels	2 or 4 fibre host channels (per controller)
Drive Interface / channel	Supports 12/ 16/ 24 channels of 3/6Gbps SAS, SATA-II/SATA-III, Nearline series
Fibre/iSCSI hybrid-host RAID models	
Host O/S Compatibility	Host O/S independent
Host Interface	8Gbps / 16Gbps Fibre + 4x iSCSI
Host Channels	2 or 4 fibre host channels (per controller) + 4x or 8x iSCSI channels
Drive Interface / channel	Supports 12/ 16/ 24 channels of 3/6Gbps SAS, SATA-II/SATA-III, Nearline series
SAS-host RAID models	
Host O/S Compatibility	Host O/S independent
Host Interface	3Gbps or 6Gbps Multi-lane SAS SFF-8088 host ports
Host Channels	Multiple SAS PHYs logically combined into 2 host channels per controller
Drive Interface / channel	Supports 12/ 16/ 24 channels of 3/6Gbps SAS, SATA-II/SATA-III, Nearline series
iSCSI-host RAID models	
Host O/S Compatibility	Host O/S independent / iSCSI offload utilities and hardware
Host Interface	RJ-45 Gigabit Ethernet / 10Gb Fibre
Drive Interface / channel	Supports 12/ 16/ 24 channels of 3/6Gbps SAS, SATA-II/SATA-III, Nearline series
JBOD models	
SAS Interface	Eight SMP PHYs interfaced through two SAS 4x wide ports
Drive Interface / channel	Supports up to 12/ 16 channels of 3/6Gbps SAS, SATA-II/SATA-III, Nearline series

RAID Configurations for RAID Models

RAID Levels	0, 1(0 + 1), 3, 5, 6, 10, 30, 50, 60, and non-RAID disk spanning
Cache Mode	All drive channels are pre-configured and cannot be changed
Cache Memory	Write-through, write-back, and adaptive write policy
Number of LUNs	Pre-installed DRAM module with ECC, registered; in two DIMM sockets
Multiple Target IDs/Host Channel	Up to 32 per host ID, for a total of 1024 on all host channels
Aliases for Target IDs	Yes
Firmware on Flash Memory	Yes
DIMM Slot	Two DRAM module slot(s)
Hardware XOR	Yes
Real-time Clock	For event messages with time record and task scheduling
Configuration	Text-based firmware-embedded utility over RS-232C through the serial cable Telnet via an established network connection LCD keypad panel The SANWatch Manager program using in-band or Ethernet connection
Performance Monitoring	Yes
Remote Control and Monitoring	Yes
Event Broadcast/Alert	Yes, via Java-based SANWatch Manager
Event Notification	Yes, via the SANWatch manager
Hardware Connection	In-band over Fibre, SAS, or other host link types, out-of-band via Ethernet or RS-232C
Configuration on Disk	Configuration data stored on disks so that logical drive assemblies exist after controller replacement.
Failure Indicator	Faults are indicated via alarm, module LED indicators, LCD panel, SANWatch Manager, or terminal emulation.

Fault Tolerance for RAID models

Drive S.M.A.R.T Support	Yes, with user-configurable detect-only, clone and replace, and perpetual clone functions.
CBM (Cache Backup Module)	Yes (R models only, optional accessory for single controller models)
ISEMS (Infortrend Simple Enclosure Management Service) via I^2C interface	Yes
Automatic Drive Failure Detection	Yes
Automatic Rebuild on Spare Drives	Yes
Regenerate Logical Drive Parity	Yes
Bad Block Reassignment	Yes
Manual and Automatic Rebuild upon Failed Drive Replacement	Yes
Manual Clone of Suspected Failed Drive	Yes
Concurrent Rebuild on Multiple Drives in a RAID (0 + 1) Logical Drive	Yes
Salvage the 2nd Temporary Failed Drive in a RAID 1, 3, 5 or 6 Logical Drive	Yes
Salvage the 1st Temporary Failed Drive in a RAID 0 Logical Drive	Yes

Power Supply

2U / 3U systems

Input Voltage	Dual controller model: 100VAC @ 10A 240VAC @ 5A with PFC (auto-switching)
	Single controller model: 100VAC @ 6A 240VAC @ 3A with PFC (auto-switching)
Frequency	47 to 63Hz
Power Consumption	Dual controller model: 530W; idle: 345W; Busy: 367W
	Single controller model: 350W; idle: 261.9W; Busy: 284.8W
DC Output	12.0V: 28A (Max.) 5.0V: 43A (Max.)
Input Frequency	47 to 63Hz
AC Input	100VAC @ 10A or 240VAC @ 5A with PFC
Power Factor Correction	Yes
Hold-up Time	At least 16ms at 115/230VAC full load after a loss of AC input
I^2C	Through backplane to controller
Over-temperature Protection	Auto shutdown when lost cooling or exceeded ambient temperature; over-voltage protection is also available.

4U Systems

Input Voltage	100VAC @ 8A to 240VAC @ 4A with PFC (auto-switching)
Frequency	50 to 60 Hz
Power consumption	434W busy; 408.9W idle
I^2C	Through backplane to controller
Over-temperature Protection	Auto shutdown when lost cooling or exceeded ambient temperature; over-voltage protection is also available.

*PSU specifications described above are general measurements and they do not represent all models. For details, please refer to specific model specifications.

Dimensions

2U series

Dimensions	Without chassis ears & protrusions	With chassis ears & protrusions
Height	88mm	89mm
Width	446mm	481.6mm
Length	514mm	531.6mm

3U series

Dimensions	Without chassis ears & protrusions	With chassis ears & protrusions
Height	130mm	131mm
Width	445mm	482.6mm
Length	514.04mm	531.64mm

4U series

Dimensions	Without chassis ears & protrusions	With chassis ears & protrusions
Height	174mm	173mm
Width	481mm	446mm
Length	543.6mm	495.5mm

Environment

Humidity	5 to 95% (non condensing – operating and non-operating)
Temperature	Operating: a. With Battery Backup Module 0º to 35ºC b. Without Battery Backup Module 0º to 40ºC Non-operating: -40º to 60ºC
Altitude	Operating: Sea level to 12,000ft Packaged: Sea level to 40,000ft
Shock (Half-sine)	Operating: 5G, half-sine, 11ms pulse width Non-operating: 15G, half-sine, 11ms pulse width

Vibration	(Random) Operating: 5 to 500Hz, 0.25Grms, X/Y/Z, 30min Non-operating: 5 to 500Hz, 1.0Grms, X/Y/Z, 30min (Sine) Operating: 5 to 500Hz, 0.2Grms, X/Y/Z Sine, 1hr/sweep Non-operating: 5 to 500Hz, 1.0Grms, X/Y/Z Sine, 1hr/sweep
Acoustic Noise	65dBA boundary, 60dBA normal

Certifications

Summary

Safety	UL (60950-1 2'nd) BSMI CNS 14336: 2005 CB IEC 60950-1, 2'nd Edition GOST-R GOST R 60950-1-2005
EMC	CE EN 55022: 2006/A1:2007 / EN 61000-3-2: 2006 / EN 61000-3-3: 1995/A1: 2001 /A2: 2005 / EN 55024: 1998/A1: 2001/A2: 2003 IEC 61000-4-2:1995/A2:2000 IEC 61000-4-3:1995/A2:2006 IEC 61000-4-4:2004 IEC 61000-4-5:2005 IEC 61000-4-6:2003/A1:2004/A2:2006 IEC 61000-4-8:1993/A1:2000, IEC 61000-4-11: 2004 IEC 61000-3-2, IEC61000-3-3 BSMI (CNS 13438) FCC (FCC Part 15,subpart B)
Environment	IEC 60068-2 MIL-STD-810E/883E ISTA ASTM-D3332 IPC-TM-650
Others	ISO7779/3744 RoHS Microsoft WHQL-Windows Server 2003

警告使用者：
這是甲類資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當對策

Slide Rail Kit Installation Guide

The table is categorized into model numbers in alphabetical / numeric order so users can fast locate the corresponding slide rail kit for their respective enclosure.

RAID/JBOD slide rail kits

If you are unable to locate clear instructions on installing your enclosure, please contact Technical Support!

Enclosure Installation Prerequisites

To ensure proper installation and functionality of the RAID system, please observe the following warnings:

- Cross check all components have been received against the “Unpacking List”. Contact your vendor immediately if anything is missing
- Install the enclosure as-is out of the packaging; install hard drives and optional modules (FBM and / or BBU) after the enclosure has been mounted
- Wear an anti-static wristband before and during the installation procedure
- It is recommended to plug the system into two different power sources (eg. into a power outlet and another into a UPS)
- Ensure the rack which the enclosure is mounted onto has proper grounding and over-current protection
- Do not obstruct ventilation openings; provide 20cm of free space at the front and back of the enclosure for air circulation; keep the ambient temperature below 35 degree Celsius

Unpacking the System

Use the “Unpacking List” to cross check all components have been received. The basic contents include one GUI CD pack, Quick Installation Guide and RAID Enclosure Installation Guide. For details on each slide rail kit contents, please refer to specific kit installation details in this manual.

Component Installation Procedure

Please install components in the following order:

1. Rackmount rails onto the enclosure / rack / cabinet
2. Enclosure onto the cabinet
3. Hard drives into drive trays
4. Drive trays (with or without hard drives) into the enclosure
5. If BBU / FBM were purchased as an optional component, the controller must be removed from the enclosure for installation.

NOTE

For detail procedures from step 3 and onwards, please refer to the hardware manual that came with your system.

Tools Required

For each of the slide rail installation procedures, you will need the following tools:

- One medium sized Phillips screwdriver
- One small sized Phillips screwdriver
- One medium size flat blade screwdriver

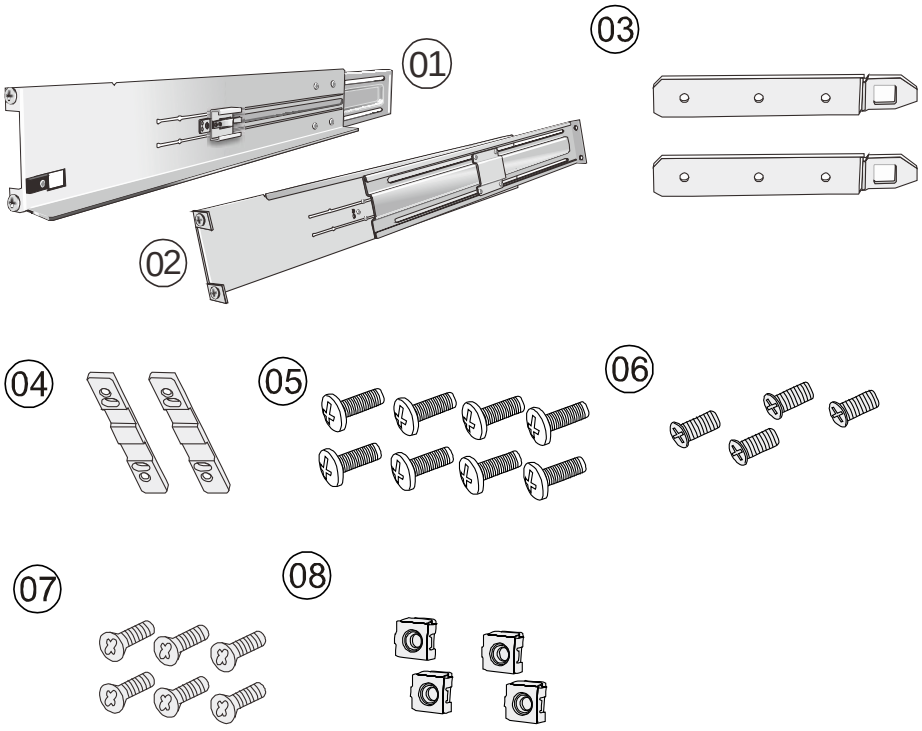
Rackmount Slide Rail Kits

IFT-9373CSlider36-0010

The following table shows all accessories that came with the IFT-9373CSlider36-0010 rackmount rail installation kit.

IFT-9373 Kit Contents

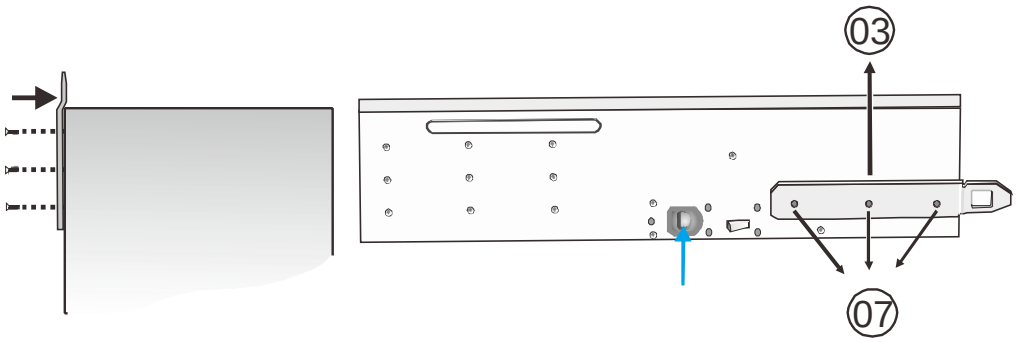
Item	Description	Quantity
01	Mounting bracket assembly, L-shape, left-side	1
02	Mounting bracket assembly, L-shape, right-side	1
03	Inner glide	2
04	Screws, cross recess round head, M5x30	4
05	Cross recess truss head screws M5 x 9.0mm	8
06	#6-32 x10mm flathead screws	4
07	#6-32 L6 flathead screws	6
08	M5 cage nuts	4



Installation Procedure

1. The installation begins with installing the inner glides **(03)** to the left and right side of the enclosure using #6-32 L6 flathead screws **(07)**. Make sure the protruding end (indicated by the **black arrow**) is bent inward as shown in the top view illustration.

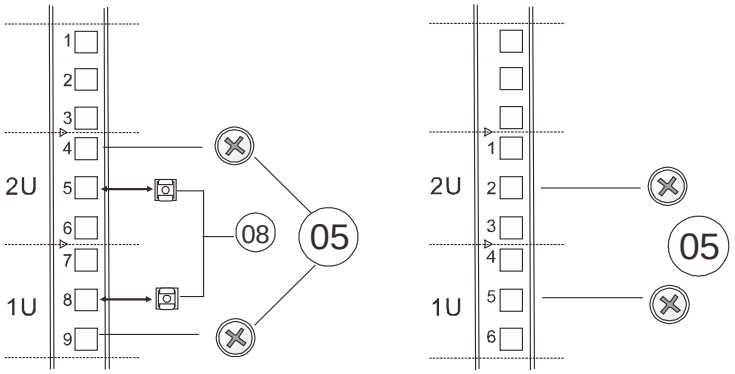
Rear of enclosure



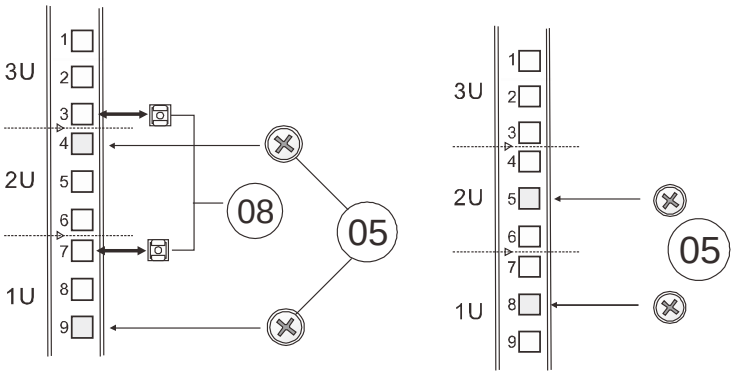
Top view **Side view**

2. If the cage posts do not have threaded holes, cage nuts **(08)** are provided to be mounted onto the posts for cross recess truss head screws M5 x 9.0mm **(05)** to secure

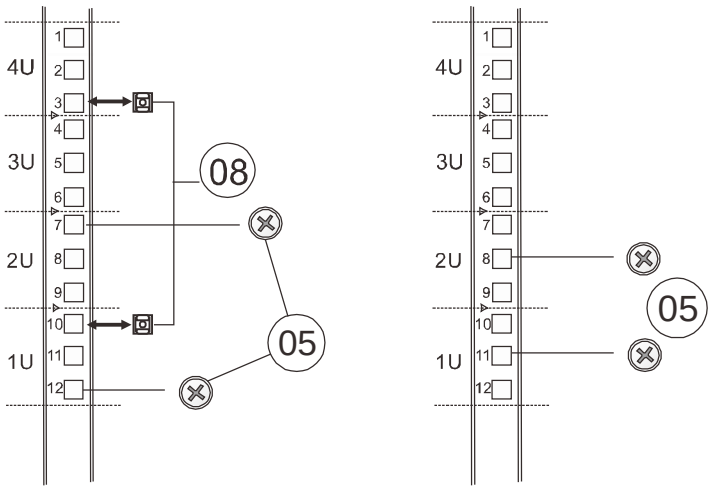
the enclosure. Please refer to the illustration below that matches your enclosure dimensions.



2U screw rackmount position

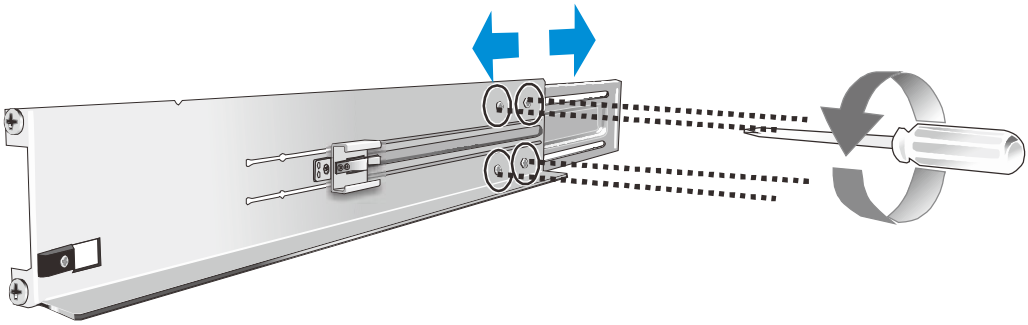


3U screw rackmount position

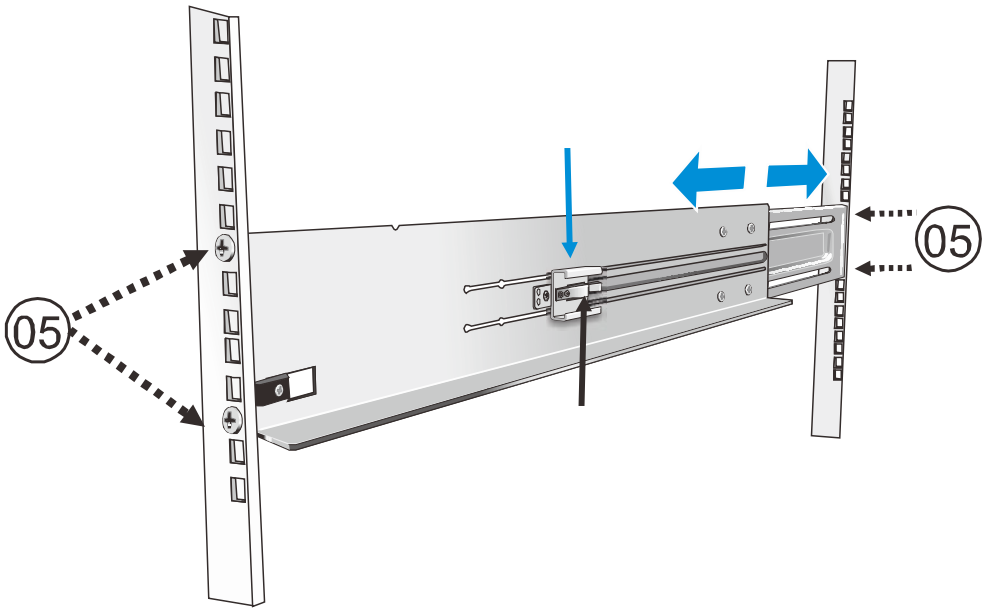


4U screw rackmount position

3. When adjusting the slide rail assembly to its appropriate lengths, make sure the L-shape rail **(01)** bend faces inwards, loosen the four screws to adjust its length.



4. Secure the front end of the L-shape rail below the top cage nut (use for securing the enclosure). Extend the rail to the appropriate length where it meets the rear post and secure the front and rear using M5x0.9mm screws **(05)**. Slide runner (indicated by the **blue arrow**) and catch latch (indicated by the **black arrow**) is to meet with the inner glides.

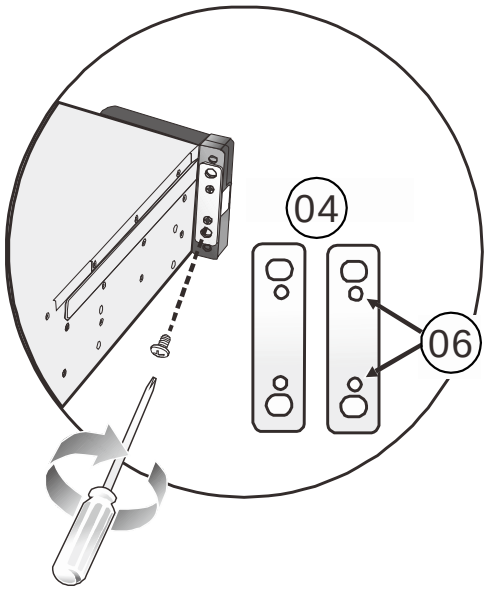


Front rack post

Rear rack post

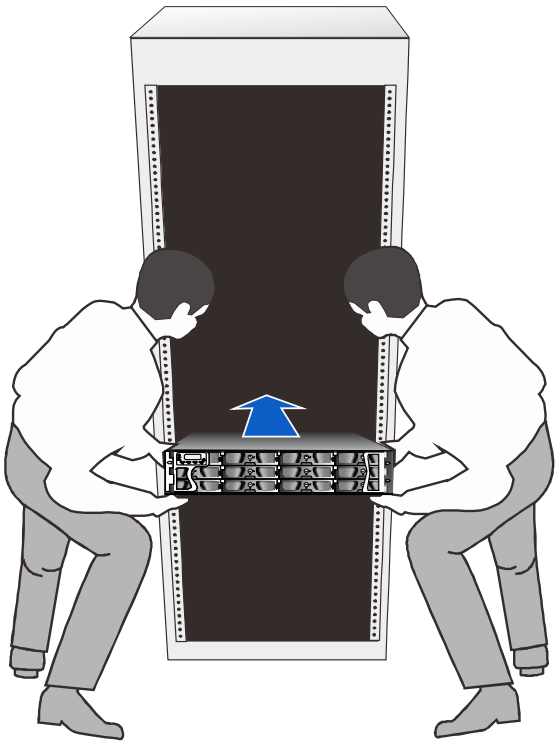
Securing rail to the posts

5. Attach the filler plates **(04)** behind the enclosure ears using two 32x10mm flathead screws **(06)** on each side (filler plates come with the system).



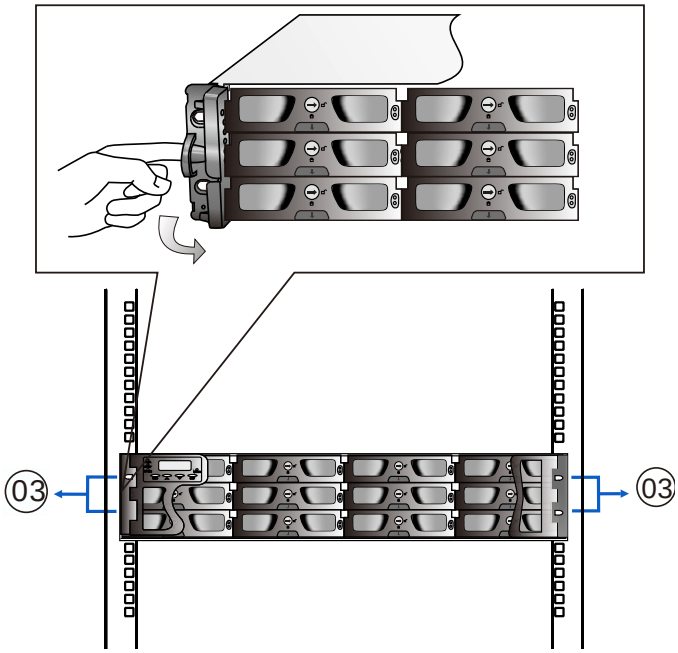
Securing a filler plate behind enclosure ears

6. It is strongly recommended that two people perform this procedure together! To mount the enclosure onto the rail and into the rack, place the enclosure on the installed rails and slide it into the rack until the front ears of the enclosure meets the front rack posts.



Mounting the enclosure into the rack cabinet

7. Secure the enclosure by using two #6 32x10mm flathead screws at the rear and four M5 x30mm screws on the forearm handles (forearm handles can also be secured using M6 / 10-32 screws from the system accessory box)



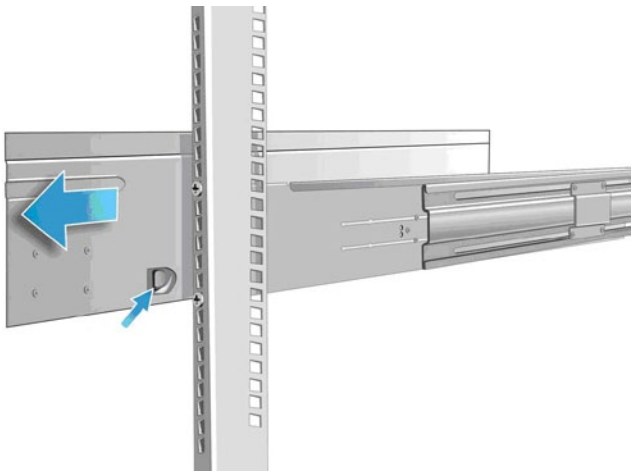
Securing the enclosure with screws in the front and rear forearm area

Removing the Enclosure

*Prior to removing the enclosure, power down your system (stop all I/O actions, please refer to Users' manual) and all hard drives have been removed!

*It is strongly recommended that two people work together on this procedure

1. Remove the screws from both sides of the enclosure's ears (Shown above in step 8)
2. Pull the enclosure out until it is stopped by the release latch
3. Use both hands to support the enclosure weight and use your index finger to press and pull the release latches (indicated by the small **blue arrow**) towards you. The larger blue arrow indicates the direction the enclosure should be pulled towards.



4. With another person's help, slowly pull the enclosure out of the rack once it has been released.

Once Mounted

Once the enclosure has been mounted, you may refer to the Users Manual that came with your system for further instructions on completing the hardware installation process. The Users Manual will go on to explain details on installation / maintenance of hard drives, controllers, optional modules (BBU, CBM, etc.), cooling modules, power supplies, cable connections, topology configurations, etc.

Safety Reminders

If you must relocate the enclosure after installation

- Cease all input / output transactions, shutdown the system, disconnect all the cables (please refer to the User Manual for details)
- Empty all drive bays (hard drives + hard drive trays) and transport them separately in safe packaging
- Modules came installed within the enclosure need not be removed

When the system is in operation

- Module and drive bays must not be empty! They must have a dummy cover / plate in place to stabilized internal airflow!
- Should a module fail, leave it in its place until you have the replacement item on-hand to take its place
- Allow 18~20cm of clearance space at the rear of the enclosure for ventilation
- Avoid touching the PCB and gold-finger connections.